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NEW YORK REVIEW OF THE

TELEGRAPH AND TELEPHONE

AN ELECTRICAL JOURNAL.

AMES.

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What Time Is It?

What time is it?
Time to do well—
Time to live better—
Give up that grudge—
Answer that letter—
Speak that kind word, to sweeten a sorrow;
Do that good deed you would leave till to-morrow.
Time to try hard
In that new situation—
Time to build upon
A solid foundation
Giving up needlessly, changing and drifting;
Leaving the quicksands that ever are shifting.

What time is it?
Time to be thrifty;
Farmers, take warning—
Plow in the spring time—
Sow in the morning—
Spring rain is coming, zephyrs are blowing;
Heaven will attend to the quickening and growing.
Time to count cost—
Lessen expenses—
Time to look well
To the gates and the fences;
Making and mending, as good workers should;
Shutting out evil and keeping the good.

What time is it?
Time to be earnest,
Laying up treasure;
Time to be thoughtful,
Choosing true pleasure,
Loving stern justice—of truth being fond:
Making your word just as good as your bond.
Time to be happy,
Doing your best—
Time to be trustful,
Leaving the rest,
Knowing in whatever country or clime
Ne'er can we call back one minute of time.

—Liverpool *Mail.*

Telephonic Concert.

A trial peformance in connection with the Crystal Palace has been made at a private reception by Major Flood-Page, at his residence in the Crystal Palace Park. The transmitter was placed in the great organ at the Palace, and one wire was conveyed to the manager's house, three furlongs away. From this distribution was made to six sets of receivers, so that half a dozen persons at a time could listen with both ears to the music. The higher passages came out with more distinctness than the lower, but all were rendered clearly and pleasantly, so that a practiced musician could dissect the music and say what stops were being used. Occasionally, by way of variety, other sounds, such as the movement of the people, were transmitted. A remarkable and novel effect was given by the simultaneous conveyance of spoken sounds with the musical notes. Side by side with the transmitter to Major Flood-Page's house was another one, in connection, by the same wire, with the residence of Colonel Gourand, about a mile and a half on the other side of the Palace. Messages were sent to Mrs. Gourand whilst the same wire was transmitting the musical passages, and her replies could be distinctly heard through the music. This result, which is analogous to the duplex telegraph system, offers the prospect of a remarkable development in the application of the telephone. The performances on this occasion imbued the listeners with a belief in the practicability of transmitting concerts and operatic performances to private houses.

International Fisheries Exhibition.

In its scope and purpose the International Fisheries Exhibition, to be held in Edinburgh next month, is modeled after its predecessor of Berlin. Its twelve classes include all kinds of fish, fishing boats and tackle, fish breeding, passes, stairs, and ladders to assist fish in their ascent of rivers, tinned and pickled fish, salted and smoked fish, fish manures, the history and literature of fishing, the pollution and cleansing of rivers, exhibits of the social condition of fishermen, aquatic, flora and fauna, and all products of the sea. The time for receiving the exhibits is from March 27 to April 4, and there will be medals and many prizes. Much less stir has been made about this exhibition in the United States than about the Berlin exhibition, but it is likely to be a display of much interest, and of course will be very full in the department of local or Scottish fisheries.

The French Academy Prizes.

The awards for the Académie des Sciences for 1881 were made known at the meeting of the 6th inst. We notice that Professor Swift, of Rochester (U. S.), received the Lalande prize of 6,000 francs, for his remarkable success in discovering comets, having announced seven in the brief space of three years. Mr. Gill, astronomer at the Cape, received a second prize for his recent determination of the solar parallax. This was deduced from heliometric observations of the parallactic angle of the planet Mars, and was found to be 8.78 seconds. This value would give 93,080,000 miles for the mean distance of our Central luminary. The prize for the most important discovery in physics was granted to M. Gaston Planté, for his secondary battery or accumulator, whilst that for chemistry was awarded to the late M. St. Clair Deville.—*Nature.*

GERMAN WIRE.—Last year German wire mills supplied England with 30,000 tons of wire, and Russia with 40,000 tons. France received from Germany 12,000 to 15,000 tons of steel wire for sofa springs, and America no less than 30,000 tons from the same source.

Telephone Experiments.

CONNECTION MADE OVER TELEGRAPH WIRES—OSWEGO PARTIES INTERESTED.

For some time past prominent railroad men of Oswego, whose names are not yet to be given to the public, have been making telephone experiments of great interest, and which promise to result in greatly extending the usefulness of the already useful instrument. The experiments have been made between Oswego and Suspension Bridge, a distance of 152 miles. The latest experiment was made Wednesday evening, and though the result was not entirely satisfactory, it is believed that complete success will soon be attained.

The experiment consists in connecting an ordinary telephone with the wires of a regular telegraph line, the batteries and everything pertaining to the telegraph being used. The connection is made by a small wire attached to certain parts of the "cut-off," or switch-board, of the telegraph and to the wires in the box of the telephone. Wednesday evening the connections were thus made to the wires of the Rome, Watertown & Ogdensburg Railway Company between Oswego and Suspension Bridge. But little that was said at either end of the line was audible at the other end. The test was made with the instruments of every office on the line between the above-named places, "cut in"—that is, in working order.

The end these gentleman wish to accomplish is to operate a telephone on a telegraph line in the same manner that the telegraph itself is operated, without interruption to either and for the simultaneous use of both. They are very enthusiastic over its partial success thus far, and claim that the obstacle now to be overcome is so slight that they will be able to perfect the instrument in a short time Should they be successful it will be a great achievement.

Inquiry concerning the practicability of this means of using the telephone, made at the headquarters of the Bell Telephone Company in this city, indicates that the plan must be something new and not understood by any one but the inventors. Nothing of the kind had ever been heard of, and it was regarded as impracticable. The telephone, the inquiring reporter was informed, uses a light but continuous current, while in telegraphing a more powerful current is used, the characters being formed by interrupting or shutting off the current at certain known intervals. While the common telegraph wire had been frequently connected with telephones, they could be used only when disconnected from the telegraph instrument. The simultaneous use of a wire for telegraphing and conversation would seem impossible, because the clicking of the telegraph instrument would entirely drown the sound of the voice. When telephone and telegraph wires run parallel with each other for two or three hundred yards, even though two or three feet apart, the sound of the instrument would be heard so plainly as to spoil all attempts at conversation.

But no one will attempt to set the bounds beyond which invention may not go.

The Influence of Stress and Strain on the Action of Physical Forces.

By Herbert Tomlinson, B.A.

Communicated by Prof. W. Grylls Adams, M.A., F.R.S. Part II. Electrical Conductivity. (Abstract).

The temporary alteration of electrical conductivity which can be produced by longitudinal traction was measured for all the metal wires used in Part I., both in the hard-drawn and annealed condition, and, in addition, for carbon and nickel.

The electrical resistances of all the substances which were examined, were, with the exception of nickel, increased by temporary longitudinal stress. With nickel, however, of which metal a wire nearly chemically pure was at length, with difficulty, procured (through the kindness of Messrs. Johnson, Mathey & Co.), the resistance was found to *diminish* under longitudinal stress not carried beyond a certain point; but after this point had been attained, further stress began to increase the resistance. The effect on nickel appears still more remarkable when we reflect that the change of dimensions produced by the stress, namely, increase of length and diminution of section, would increase the resistance.

The *specific* resistances of all the substances, except nickel and aluminium, were increased by temporary longitudinal stress. With aluminium and nickel the specific resistances were *diminished* by stress not carried beyond a certain limit.

One of the most remarkable features discernible in the results is the similarity of the order of the metals to that of the order of "rotational coefficients" of metals recently given by Prof. Hall (*Nature*, vol. xxiv., p. 46; abstract of a note read by Prof. E. H. Hall, at the meeting of the British Association at York,); indeed so striking is the relationship in the case of metals, iron, zinc, aluminium, and nickel, that there would appear to be no doubt that a series of experiments made with a view of determining the effects of mechanical stress and strain on the "rotational coefficients" would be of the greatest value.

Another point to be noticed is that the alteration of the specific resistances of the alloys brass, platinum-silver, and German-silver, is much less than that of the several constituents of these alloys, and at first sight there would appear to be some relation between the alteration of resistance caused by change of temperature and that due to mechanical stress; but it has been proved by these and other experiments that the increase of resistance caused by rise of temperature is, in some cases, one hundred times that attending the same amount of expansion by mechanical stress; and, apart from the fact that with nickel and carbon the effects of change of temperature and of longitudinal stress are of an opposite nature, it is evident that the former are to be attributed to other causes than mere expansion.

Compression was proved to produce on the electrical resistance of carbon a contrary effect to that caused by extension; this statement applies to the alteration of specific resistance as well as of the total resistance.

Stress, applied in a direction transverse to that of the current, was also found to produce in several metals both temporary and permanent alterations of resistance, of a nature opposite to those resulting from longitudinal traction.

Stress applied equally in all directions by means of an hydraulic press was proved to diminish the resistance of copper and iron; and the experiments showed that the lowering of the temperature of the freezing point of water can be accurately and readily measured by observations of the change of electrical resistance of a wire.

The total resistance of most metals is permanently increased by permanent longitudinal extension, but with nickel the *total resistance* is permanently *decreased*, provided the extension does not exceed a certain limit; beyond this limit further extension causes the resistance to increase.

The small effects which can be produced by permanent extension, hammering, and torsion on specific electrical resistance were very fully investigated, and are shown in the paper by a series of curves. All the metals examined, except iron and nickel, have their specific resistances increased by strain caused by the above-mentioned processes, provided the strain does not exceed a certain limit; beyond this limit further strain decreases the specific resistance. In the case of iron and nickel, on the contrary, the specific resistance is at first *decreased* and afterward increased.

The effect on the resistance of annealed steel produced by heating and suddenly cooling was also studied, and it was proved that if the steel be heated to a temperature under "dull red," sudden cooling *decreases* the resistance; whereas if the metal be heated up to or beyond the "dull red," sudden cooling *increases* the resistance; the strain, therefore, caused by this process, and that resulting from purely mechanical treatment, are similar as regards their influence on the electrical resistance.

The amount of recovery of electrical conductivity produced by time in wires, which are in a state of strain, is shown in the paper for several metals by a series of curves, and these exhibit most conclusively the superiority of platinum silver over German silver when an accurate copy of a standard resistance has to be kept for a long period of time; in fact, of all the metals tested, German silver showed the most marked recovery of conductivity, and platinum silver the least.

The recovery of electrical conductivity is in all cases attended with recovery of longitudinal elasticity and of torsional rigidity.

A full examination of the influence of permanent strain, on the susceptibility to temporary change of resistance from change of temperature, showed that metals may be divided into two classes. In the first of these classes, which includes iron, zinc and platinum silver, the strained wire is *most increased in resistance* by rise of temperature up to a certain limit of strain, whilst beyond this limit further strain diminishes the first effect. In the second class, which comprises copper, silver, platinum and German silver, the strained wire is *least increased in resistance* by rise of temperature, but that, here again, after a certain point of strain has been reached, the first effect begins to be diminished.

After some trouble, means were found of measuring with considerable accuracy at 100° C. the alteration of electrical resistance due to temporary longitudinal traction, and the experiments led to the belief that the elasticity of iron and steel is not temporarily but *permanently* increased by raising the temperature to 100° C. Subsequently direct observations of the elasticity made in the manner described in Part I., but on shorter lengths of wire, placed in an air-chamber, the temperature of which could be maintained constantly at 100° C., proved beyond a doubt that if M. Wertheim, to whom we owe so much of our knowledge concerning elasticity, had examined the elasticity of iron and steel after these metals, tested at the higher temperature of 100° C., had again cooled down to the lower one, he would have found that what to him *appeared*, in the case of these metals (*Ann. de Chimie et de Phys.*, 3me serie, 1844, p. 431) to be a *temporary* increase of elasticity was *really* a *permanent* one, and if the wires used had been tested several times, first at the higher and then at the lower temperature, he would have also found, *provided sufficient rest after cooling had been allowed*, that the elasticity of both iron and steel is *temporarily diminished* by raising the temperature to 100° C.

The temporary alteration of susceptibility to change of resistance from change of stress, which is effected in the case of nickel by raising the temperature to 100° C., is as remarkable as the susceptibility itself, and the maximum diminution of resistance which could be produced by stress when the metal was at the temperature of the room was actually *more than twice* that at 100° C.

The alteration of electrical conductivity which can be produced by magnetization was carefully studied and a full account of the modes of experimenting, of the apparatus employed, and the precautions adopted will be found in the paper. The substances examined were iron, steel, nickel, cobalt, bismuth, copper and zinc, and in all cases, except that of copper, it was proved that longitudinal magnetization increases the electrical resistance, whether the substance is in an annealed or unannealed condition.

Of all the metals examined, annealed nickel was by far the most affected by a given amount of magnetizing force.

The increase of resistance produced by magnetization can be very accurately represented by the formula $\gamma = a \,.\, \alpha + b \,.\, \beta$; where γ is the increase of resistance, α the magnetizing force, β the induced magnetism, and a, b constants for the same substance when the same amount of current per unit of area flows through the substance.

In the paper, curves are shown exhibiting the connections between increase of resistance, magnetization, and induced magnetism. From these curves, and from the fact of the above-mentioned formula holding good, it is assumed that the resistance will go on increasing with the magnetizing force, even when the latter is so great that further increase of force does not produce perceptible increase of magnetism.

The "circular" magnetization which any magnetic substance undergoes when a current is conducted through it, seems to have very little or no appreciable effect on the electrical resistance of the substance, so that, is we compare the resistances of iron and platinum, the ratio of the two will be independent of the electro-motor employed in the "bridge."

The effects of temporary stress on the alteration by magnetism of the resistance of an iron or nickel wire are of a somewhat similar nature to those caused by the stress on the magnetic inductive capacity of these metals, and the same may be said with regard to the effects of the permanent strains due to extension, torsion, &c. Longitudinal stress, which may be made to diminish considerably the susceptibility to alteration of resistance from magnetization, cannot even when carried to the extent of causing breakage, change the *nature* of the alteration. There is apparently a close relationship between the "viscosity" of a metal and its specific electrical resistance, and it seems very probable that a full investigation of the former of these two physical properties by the method of torsional vibrations would afford valuable information respecting the latter.

Nature Revealing her Treasures.

A lofty mass of rock which threw its shadow over Las Vegas, N. M., half a mile away, lately tumbled into the valley. Five to fifteen thousand tons of rock were loosened from their foundation. The mountain towered 5,000 feet above the Gallinus River. The most remarkable result of this violent change is found to be the disclosing at the point of rupture, high on the mountain side, of an eight-foot vein of copper carbonates and sulphides, which was promptly located by F. B. Martindale, and he is now holding his claim with a brace of forty-fours. Half way down the side of the mountain a coal bed was laid bare, which was also pre-empted as soon as discovered.—*San Francisco Bulletin.*

Electric Lights for Streets.—A committee is now selecting certain streets in Baltimore, Md., upon which to place electric lights.

The Land System in the Channel Islands.

LEEDS MERCURY.

Jersey contains about 28,000 square miles, and Guernsey 25,000. The islands of Alderney and Sark are considerably less, the former being chiefly famous for its breed of cattle, and the immense amount of money spent by the Government in constructing a breakwater and harbor of refuge, on which account it has been called "the Bull-dog of Cherbourg;" while Sark is smaller still, though beautiful and romantic, lying but six miles from Guernsey. These islands, though under the British Crown, are managed after the Norman fashion. The whole thing is very striking to the stranger. They have no room in many parts for walls and hedges, but simply stones or stakes driven into or built upon the ground to mark off one estate or farm from another. Not a foot of land is lost. The farms, too, are very small, and their extreme neatness and economy attract the attention of visitors. Besides producing the usual rotation of crops, as wheat, barley, clover, hay, and parsnips, the orchards are, if possible, even more productive. Chaumontel pears, many varieties of melon, along with fig trees and vines, flourish abundantly, and that without shelter in the winter. The smaller kinds of fruit are equally plentiful, as a visit to the fruit market in summer abundantly shows—the strawberries being often sold at a penny per pound. We found the size of the farms was reckoned not by acres, but by a measure called a "vergee," two vergees and three-quarters going to an acre. The holdings seldom exceed 15 acres. Most of the soil is of first-rate quality—a rich, deep loam, resting on a gravelly bottom.

The Native Personnel of Japanese Railways.

The skill and ingenuity of the natives of Japan have long been well known, and another proof of their possession of these qualities is given by the aptitude which they display in learning the working of railways and qualifying themselves to fill the more responsible of the subordinate positions. The Japanese, from whom, for some time past, all the station masters and porters, as well as plate layers and artisans had been drawn, have latterly been gradually replacing the English engine drivers, and apparently with satisfactory results. The chief fault to be found with the native drivers is, seemingly, that they do not thoroughly understand the construction of the engines under their charge, but this is a matter which longer experience will rectify. There also appears to be a lack of presence of mind and watchfulness, and it is somewhat ludicrous to read of a driver starting with only half of his train in broad daylight and not discovering the want of the other half until he had reached the next station. It is, therefore, not surprising that strict examination and supervision has to be kept on all engines under native drivers, in order to avoid any chance of failures or casualties. At the same time, we are assured that very few mishaps had occurred—indeed, so far as misadventures with the locomotives are concerned, the Englishmen appear to have been quite as often at fault as their native fellows—whilst the increasing number of Japanese employed bears testimony to the confidence which is felt in their capabilities. In other capacities the native workmen display great skill, the carriage and wagon building, for instance, being carried on in a highly satisfactory manner by the Japanese foreman carpenter; and two engines which had been transferred from one line to another, having been put together again and got ready for work by a native fitter, without any assistance from Europeans. The only complaint made against them is that they are somewhat slow. It is clear, however, that the Japanese are quite well enough qualified to carry on the working of their railways; and, after the system has been completed, we should not be surprised to find that eventually they took the entire control into their own hands.—*London Architect.*

A Study of the World's Carrying Trade.

A statistician of ability has just produced a series of comparisons between the commerce, the railroads, the shipping, tonnage, and carrying power of the world, and contrasts the work accomplished in 1880 with that in 1850. If the commerce of the globe represented $4,280,000,000 thirty years ago, in 1880 it was $14,405,000,000, or there was the amazing increase of 240 per cent. To carry this augmented quantity, railroads have had 398 per cent. more of mileage, while tonnage of ships has been made much larger by a capacity represented in the thirty years by 171 per cent. In 1850, with 6,905,009 of ships' tonnage, the carrying power was 8,464,000 tons; last year it was 18,720,000 tons, with a carriage capacity of 34,200,000 tons, or with the wonderful augmentation of 304 per cent.

Representing it in another light, for every $6,000,000 worth of commodities carried in 1850, there were 52 miles of railroad, and a carrying capacity on the water of 9,900 tons. In 1880 these goods could be moved by 77 miles of railroad and 12,000 tons of shipping. What a vast power must be that of the United Kingdom.—*Nature*, London.

New Mode of Smuggling.

A singular adaptation of the railway engine has just been made in Russia. Information having been given to the authorities at Alexandrovo, on the Polish frontier, that the locomotive of the express leaving that station for Warsaw had been ingeniously converted into a receptacle for smuggled goods, it was carefully examined during its sojourn at the station. Though nothing was found wrong, it was deemed advisable that a Custom House official should accompany the train to its destination, where the engine furnace and boiler were emptied and deliberately taken to pieces. In the interior was discovered a secret compartment, containing 123 pounds of foreign cigars and several parcels of valuable silk. Several arrests were made, including that of the driver, but his astonishment at finding the engine to which he had so long been accustomed converted into a hardened offender against the laws was so genuine that he was released and allowed to return to his duties.

Tracing the Storms.

The matter of a Signal Service system for the Pacific coast, by which we may be enabled to fix their entrance on this coast and trace their direction, has long been talked of and desired. The prospects are now that the system will soon be inaugurated. Lieut. C. H. Kilbourne has recently returned from a trip north, where he went to select sites for the establishment of the new Service stations, which it is thought that Congress will this winter appropriate funds for. He reports as the result of his observations, that the general path of storms upon the Pacific coast is from the west eastward, with a southeasterly trend. The storm center strikes about Victoria, and the southern outer circle of the storm usually strikes Cape Flattery, the most northwestern point on our territory, first. The full force of the storms is felt in British Columbia, where the winds work great ravage. Therefore, a station upon Cape Flattery would give the first indications of approaching storms. For this reason Flattery is chosen as one of the proposed posts. Another station will be established at the mouth of the Columbia, or on Tillamook rock.

Another point that the Lieutenant is specially instructed to investigate is at Cape Mendocino. The benefit arising from taking observations at those points can hardly be estimated, as the whole system of calculations must be based mainly upon them. There are now but two coast stations—that in this city, and the San Diego station. It is thought that, in addition to these stations, another will be established at Cape Disappointment. In the event of an appropriation being passed for these stations this winter, an independent coast weather service will be inaugurated here, the observations of which will eventually add much to the general knowledge of the meteorology of the Pacific Coast.—*Ex.*

Electric Lighting on Railways.

There have recently been made upon the Northern of France Railway some interesting experiments in the direction of illuminating the road and signaling the presence of an engine by the electric light. On the front of the locomotive, upon a stage on the right hand, a Brotherhood three-cylinder engine is placed, working direct a Siemens dynamo machine placed at the side. The steam is furnished by a long tube, controlled by a tap within reach of the driver. The current produced by the electrical machine is sent through a glycerine regulator placed in the center and at the front of the engine. It appears that there is thus obtained a magnificent illumination, giving the driver the possibility of surveying the road ahead, but drivers coming in the opposite direction are, it is said, slightly dazzled. It is said these experiments will not be further continued at present; but it is probable that the passenger trains will shortly be lit by incandescent lights, sustained by accumulators charged by dynamo machines, worked off the axles of the wheels during the running of the trains.

Lumber Statistics.

Professor Sargent, of the forestry department of the census, furnishes us with more statistics on the subject of the timber supply of the country, and the lumber product. His maps show that Michigan has yet standing 33,000,000,000 feet of pine; Wisconsin, 41,000,000,000 feet, and Minnesota, 6,000,000,000 feet. The total for these three States, which include the whole forest section of the Northwest, is 80 000,000,000. The three Southern States of Texas, Mississippi and Louisiana, on the other hand, contain 116,000,000,000 feet of standing pine. At the present rate of cutting, the pine of Michigan will be exhausted in eight years, and in Wisconsin in eighteen.

Among the novelties of the Crystal Palace Electrical Exhibition, in London, are electric till tell tales said to be capable of recording the amounts placed in the tills and to be so arranged that they cannot falsify; a silk-testing machine, which records by electrical means the defects in a thread of silk passed through it at the rate of a mile in eight minutes; an electrical water-level indicator, showing, at any distance and by means of a single wire, fluctuations in the height of water in reservoirs, tanks, steam boilers, and tidal ways; and a system of time-keeping in which any number of clocks are worked by one regulator, the whole arrangement being electrically self-acting, neither the regulator nor the clocks requiring winding, setting, or adjusting.

From observation of the diffusion of sunlight by clouds, M. Clemandot was induced to experiment with mineral wool, or spun slag, in order to ascertain its effect upon the light of the electric arc. He has found that when the rays pass through this substance, seventy-five or eighty per cent. of the light becomes available for illumination; while the ordinary processes make useful not more than forty-five or fifty per cent.

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The marked improvement in the workings of the Weather Bureau under its present able and efficient management, and the hearty manner in which its valuable and indispensable service is now appreciated by the public, may justly be a source of satisfaction and pride to General Hazen and his staff, who have labored so arduously since assuming charge of that department. It could scarcely have attained such prominence in so short a time under any other management.

Mr. Henry Bentley, of Philadelphia, President of the Philadelphia Local Telephone Company, deserves the gratitude, not only of those who are especially interested in telegraphy and telephony, but all who appreciate the value of the records of arts of such vital importance as these have come to be. Mr. Bentley's experience, both with the telegraph and telephone, extends over the whole period of their growth; and he has put into concrete shape, as it were, for the benefit of others, all this interesting experience, by preserving samples of all the most important instruments and appliances which have been used or tried, in all these years. The importance of this collection becomes evident when it is considered that it contains many interesting specimens which cannot be duplicated.

Mr. Bentley's position has been one favorable for the obtaining of these interesting samples; but it is quite wonderful how a man, who has lived so busily, and successfully, could have spared the time or energy to make such a cabinet.

That Mr. Bentley may continue this good work long in the future, is the wish of his many friends.

The National Bell Telephone Company of Portland, Me., have completed a trunk line from Lewiston to Bath, 39 miles, which gives Portland a connection with Bath. This is one of the longest telephone lines in New England. It is working well and giving good service. The company expect to complete a line to Augusta, the capital, soon.

La Lumière Electrique, reviewing the progress of electrical science during 1881, remarks that the chief objects which have occupied the attention of electricians during that period have been the telephone, transmission of power and electric lighting With regard to the electric light it has been proved that it can be distributed, and produced at a sufficiently low intensity, and with enough warmth of color to satisfy the requirements of domestic use. As to its comparative economy, that has yet to be satisfactorily demonstrated, but the advance in this direction is certainly considerable The light has also been employed for railway carriage illumination, for the lights of steamships, and for underground purposes in collieries. The transmission of force has perhaps advanced more than any other branch of the subject. Up to the end of 1880 comparatively little had been done in this direction; but the Electrical Exhibition contained machinery driven by electricity of almost every class, such as sewing machines, pumps, circular saws, rock drills, lifts, plows etc., whilst the electrical railway gave evidence of the practicability of employing this force for purposes of traction. Although little that is absolutely new has been attained in telephones, many inventions and improvements which were before only theoretical, have been reduced to practice, and have rendered the employment of the instrument more easy and useful. M. Du Moncel will continue this review, taking up each branch of the science in turn.

The public schools of the State of New York were last year attended by 1,021,282 children, a smaller number by 10,000 than was recorded in 1880. Of the 30,826 teachers employed, 23,157 were women. The average annual salary of each teacher was $375.06, the whole amount expended in salaries being $7,775,505.22. The State has 11,248 school districts and 11,894 school-houses. The total amount expended upon the schools last year was $10,808,802.40.

We are delayed from publishing the description of the new instrument on account of not receiving the electrotypes in time,

Prof. Berly's System of Distributing Time.

It would seem that Prof. Berly's Company are making considerable progress in London towards establishing his new system of distributing time. We note the following from the *City Press* of the 22d ult. We hope at an early day to give a full explanation of the system:

"Mr. Bates (acting for the Clerk, who was detained on a jury), submitted a memorial of Mr. J. A. Berly, on behalf of the Compagnie Générale des Horologes Pneumatiques, relative to their system of distribution of time by means of compressed air, offering to supply and maintain public clocks free of cost (say for fifty years), in consideration of their being allowed, for the same period, to lay pipes for the purpose of communication with private houses.

"The subject was referred to the Streets Committee."

We are pleased to acknowledge the receipt of a very encouraging letter from B. I. Throop, Esq., agent and manager of the Bell Telephone Company of Canada, located at London, Ont., who states the business to be very favorably progressing at that point. They have one hundred and eighty-one subscribers and are adding new ones daily.

LUMINOUS BUOYS.—Two large buoys, each having a surface of 90 square feet above water, coated with luminous paint by the local agents, Messrs. Holmes & Co., Waterloo street, Glasgow, for the Clyde Trust, will be placed in their respective positions next week. The satisfaction expressed at their appearance at night on land, indicates that they will confer a great boon upon those persons who have occasion to navigate vessels up and down the Clyde by night.—*Engineering*, London.

It would seem that Balmain's luminous paint, which is alluded to in the above article, is coming into favor among navigators and our merchant marine generally, and it will no doubt play an important part in navigation of the future. We notice the important testimony of the Captain of the steamship Arno, sailing between Southampton, England, and the West Indies. When on his last voyage to Porto Rico the first officer of the steamer discovered one night, just a few miles off St. Thomas, a luminous buoy about a quarter of a mile distant, directly in the course of the steamer, which they would have run over had it not been illuminated. They had no trouble in avoiding it, and after arr'ving at Porto Rico, subsequently ascertained that it had been placed there by the Cable Company. Messrs. F. W. Devoe & Co., of this city, the proprietors of this recent invention have reason to be proud of the successful experiments so far made.

It is destined to greatly facilitate the navigation of shoal waters and harbors where buoys are placed and become invaluable in this respect.

In connection with the International Electric Exhibition at the Crystal Palace, arrangements have been made with Prof. S. P. Thompson, of University College, Bristol, to give the following course of lectures: —1. Electric Currents—What are they? (February 22); 2. Electric Currents—How to make them by Steam? (March 1); 3. Electric Arc Lights (March 8); 4. Electric Incandescent Lamps (March 15), on each evening at 8 p. m. The lectures will be illustrated by diagrams in the magic lantern, by experiments on a large scale, and by experiments in the magic lantern. This is a praiseworthy step on the part of the directors, and we hope it will meet with encouragement.—*Exchange.*

In Paris pearls are now in great fashion. Fine necklaces of Oriental pearls have sold lately for from 300,000 to 1,200,000 francs.

Electricity Versus Gas.

About five years ago I pointed out that land would fall in value. It seemed to me evident that this would be the case, because larger and larger tracts of Western prairie were each year being converted into great corn farms, and the means of transport of this corn to our ports were each year rendered more easy. No one, however, believed me before the event proved that I was right, for one of the peculiarities of the English mind is, that it can never realize that what is will ever cease to be, until the "will be" has become the "is."

When Edison made his discoveries in electric lighting, again I raised my voice, and said—or, to put it more accurately, again I raised my pen, and wrote—that the wise who held gas shares would do well to sell them. Edison's invention was not perfected. Gas directors jeered at it; it would never be more, they said, than a pretty theory, and even if it were to vanquish gas as a lighting medium, the companies would sell as much gas as they do at present for heating purposes, and this, with the sale of their "residual products," would secure to them as good profits as heretofore. Now, I was as well aware as others that the idea of lighting by electricity had not as yet assumed a clear, practical form, but I knew that the minds of so many would be devoted to giving it that practical form, that in the end they would succeed; while, as to selling gas for heating purposes and sell ing "residual products," I had calculated the results and knew what they were.

Let those who hold the shares of gas companies ponder over the following facts and figures. If they regard them as incorrect, then let them keep their gas shares. If, on the other hand, they arrive at the conviction that they are correct, they will take advantage of the folly of the mass of mankind and accommodate some fool with their shares before the collapse comes.

The mode in which electrical light is produced is very simple and can easily be comprehended when explained in plain and unscientific language. If you move a wire near the poles of a magnet, backwards and forwards, along what are called its lines of force, a current of electricity is attracted to the wire, and runs from one end of it to the other, provided there be a complete circuit. The strength of the current is in proportion to the size of the magnet and to the velocity with which the wire is moved across the "lines of force." Having got a magnet and a wire, the next thing, therefore, is to adapt motive power to them, which moves the wire quickly—that is to say, to a steam engine. The engine, wire and magnet together, then, form a machine which is called a "generator." With its aid, a stream of electricity is thrown into the wire. Now, if the wire be cut at any place, and then the interval between the two points be bridged over with a filament of carbon, the electricity passing through the carbon becomes incandescent. This constitutes the incandescent lamp. The carbonized filaments are enclosed in globes of glass in which there is no air, and in which, consequently, the filament lasts for several months without being destroyed. There are other systems, all based upon one principle and called "the arc," in which the electric ity leaps from one stick of carbon to another, and in which the sticks burn like candles. In street lighting the arc is used, and, light for light, it is cheaper than gas. In the city the electric companies that light the streets are paid what the gas companies were, and for this they supply four times as much light. Gas is used to work the generators, but the amount of gas which would maintain a light of 12-candle power, employed in turning a generator, produces an arc of 1,600-candle power. If the same engine were employed to supply the incandescent lamps, the same quantity of gas would produce 12-candle power lamps, with an expenditure of a sixteenth part of the gas now requisite for this. The reason of this is that incandescent lamps have to be worked at a much lower temperature than arc lamps.

Electric light supplied to houses ought not to be, even in the present condition of the light, dearer than gas. Mr. Edison is now laying down 500 miles of electric light mains in New York City, and he will light every house with his incandescent lamps at the price which the owners are now paying to the gas companies. As a matter of fact, however, the light can be produced, as soon as mains are laid down, at a far less cost than gas.—*London Truth.*

Opening of the Calcutta Telephone Exchange.

The proceedings of the Telephone Company in Calcutta have been sufficiently advanced to warrant the opening of the "Exchange," which ceremony accordingly took place on Saturday afternoon last before a large company of ladies and gentlemen, Major the Hon. E. Baring undertaking the duty of formally declaring the establishment open. The Government of India was further represented in the Public Works Department by the Hon. Mr. Gibbs and General Fraser; while representatives of all classes of Calcutta society were included in the assembly.

Among others invited were Lord William Beresford, Captain and Lady Elizabeth Clough Taylor, Lieut. Hon. W. W. Eden, Major A. L. Filgate, Sir Richard and Lady Garth, the Misses Gibbs, the Hon. A. B. Inglis, the Hon. W. F. McDonnell; Major H. Mallock, the Hon. G. E Morris, Colonel R. Murray, the Hon. Mr. and Mrs. G. C. Paul, the Hon. Mr. and Mrs. C. Pontifex, the Hon. F. Prestage, the Hon. H. T. Prinsep, Commander A. D. Taylor, the Hon. Mr. and Mrs. A. R. Thompson, Major-General J. S. Trevor, the Hon. J. S. White, the Hon. A. Wilson.

The "Exchange" is situated at 7 Council House street; and Mr. Clement Davidson Legatt, the representative, with full powers in Ceylon and India of the Oriental Telophone Company, and the agents of the company in Calcutta, Mess. Carlisle Nephews, received Major Baring on his arrival at the entrance to the Exchange, and conducted the honorable gentleman to the "central switch room," where all the guests were assembled. The telephone was then successively connected with the *Englishman* Press Office, Messrs. Carlisle Nephews, Spence's Hotel, the Great Eastern Hotel and several other offices, and the speaking power of this extraordinary instrument was tested without the slightest interruption, manifesting the extraordinary rapidity with which "the connections were formed" and conversation carried on.—*The Englishman.*

The temperature of the southern hemisphere has lately been investigated by Dr. Hann with the aid of recent observations of temperature in high southern latitudes, especially those made during the Venus transit in 1874. For mean temperature of the whole hemisphere he obtains 15°.4C., and as that of the northern hemisphere has been estimated by Ferrel to be 15°.sC., it is very probable that both hemispheres have the same mean temperature. Dr. Hann, however, also shows that between 40° and 45° south latitude the southern hemisphere becomes warmer than the northern in the same latitude, and that a difference between the two persists at least to the confines of the hypothetical antarctic continent. The results of the projected antarctic scientific expedition this year, which will include a whole year's meteorological and magnetic observations in high latitudes, will do much, doubtless, to clear up the subject of temperature. Dr. Hann urges the usefulness of a careful determination of ground-temperatures on islands (McDonald's Islands, Auckland, Maquarie, South Orkney, &c.).—*Nature.*

The next issue of this paper will be 6,000 copies

The Channel Tunnel in Parliament.

It might, perhaps, be sufficient to point out that even an infinitesimal risk to the security of England ought to be sufficient to deter the legislature from sanctioning the tunnel scheme, but it is contended by men whose experience and acquaintance with military science entitle them to speak with authority that the risk would be of a very real and tangible kind. Against surprise either in warfare or in anything else it is impossible to provide safeguards which will be absolutely secure. In an article which recently appeared, and which we will not attempt to condense, it is shown with what comparative ease, despite every precaution, the English extremity of the tunnel might be seized by a daring body of men, and the strategical insularity of England completely destroyed. It is an open secret that Sir Garnet Wolseley is "the military authority occupying the highest position" whom Lord Dunsany so largely quotes in the article in question, but he is only the mouthpiece of the great majority of men who have made strategical science their study. It may be objected, and has been objected, that his arguments are based upon hypothesis, but in dealing with such an issue as this it is necessarily against contingencies which are possible and not necessarily probable that we must provide. Given an unscrupulous but ambitious man as the ruler of France, of the type of the first Napoleon or Frederick the Great, and the mere existence of a Channel tunnel would supply a temptation for a *coup de main* which would probably prove irresistible. Whether that *coup de main* would or would not be successful would depend perhaps to a great extent upon accident. Equally hazardous strokes have been made over and over again and have proved successful, and why should not such an attempt be equally rewarded? Against this "hobgoblin theory" nothing more solid is advanced than that it is very unlikely, nay, in an extreme degree, improbable that it would be realized. but this is no answer at all, for it is proverbial that it is the unlikely which always happens. But not only would a tunnel prove a source of danger by providing for the admission of an enemy, it would supply him with an easy and certain means of effecting a retreat.

A story has recently been told of Count Moltke, which happily expresses the dangers consequent on an attempted invasion of England. "I have," said the great strategist, "five plans for invading England, but not one for getting out of it." With a Channel tunnel at his command, the invader would be under no apprehensions as to the possibility of effecting a retreat. It is, however, urged by Sir John Adye and Sir Andrew Clarke, men whose opinions on such a point necessarily command respect, that a surprise is impossible, and that even if the English end of the tunnel were seized by a couple of thousand men it would be impossible for a formidable army to emerge from it without the certainty of being annihilated. But, after all, the most that can be said in favor of these arguments is that they are probably sound, not that they are indubitably so. We do not now propose to deal with the supposed commercial advantages which would arise from the establishment of railway communication direct with the Continent. We believe that they are immensely exaggerated, and that the expense of carrying goods through a submarine tunnel would necessarily exceed ordinary freights by sea. The whole question lies within a very narrow compass. Granting that the advantages to be derived from a submarine tunnel were one hundred fold greater than they are, would it be worth the while of England to encounter such a risk as that we have exposed? Continental nations which are only too familiar with war, and have only too often experienced the horrors which it entails, would, if in our position, dismiss the proposition without giving it a second thought.—*Morning Post.*

Transit Over the Bridge.

CARS TO BE CLAMPED WITH A BRAKE TO AN ENDLESS WIRE ROPE—THEY WILL BE SWITCHED FROM TRACK TO TRACK ON HIGH PLATFORMS AT THE ENDS, WHICH MAY BE CONNECTED WITH THE ELEVATED ROADS.

At a meeting of the trustees of the East River Bridge held the 6th inst., the mode of car transit across it was definitely decided upon. The cars are to be drawn over by an endless wire rope kept in constant motion, and are to run on the circulating system—that is to say, they will be drawn over on one track and back on the other, being switched by motors from track to track at the termini upon elevated platforms. The elevated platforms will prevent any encumbering of the roadway of the bridge, and will afford a connection with the elevated roads if that is deemed necessary. This plan was rendered more feasible by an invention of Col. W. H. Paine, of the engineer corps of the bridge, by which the cars may be attached to the wire rope by a clamp, the sides of which are composed of revolving grooved wheels, brought into action upon the rope or spread apart by the movement of a lever brake. A car can be detached from the rope or can be started by one motion of the brake and the grip of the horizontal wheels can be tightened until the cars partake of the full speed of the wire rope.

Trustee Clarke of the Transit Committee said it had been urged that wire rope was likely to break and might cause delay, but this could be prevented by having another rope alongside, ready for use. All danger would be prevented if the rope broke by the elevated termini. Rope traction had been successfully used in San Francisco, and had recently been introduced in Chicago. Under this plan trains would move at the rate of ten miles an hour, and could carry 7,000 passengers each way in an hour. The report recommending the plan was unanimously adopted.

The special committee appointed to report the amount of money needed by the bridge, in addition to that already appropriated, submitted the following estimate from the chief engineer: Liabilities under outstanding contracts, $565,322.32; estimated cost of material required for the completion of the bridge and approaches other than that contracted for, $114,670.60; salaries of officers and engineers, and cost of labor for completing the bridge and its approaches, $117,632.97; total, 797,625.89 Cash on hand Feb. 1, 1882, and due from the two cities, less liabilities for salaries and material received in January, $553,557 39; amount required for the completion of the bridge and approaches, in addition to the money on hand and due, $244,068.50; cost of elevated platforms, including track arrangements, ropes, waiting rooms, &c., $268,908; cost of machinery, boilers, hauling ropes, &c., $37,978; boiler house, $12,000; rolling stock, $132,000; ten per cent. for contingencies, $45,088.69; total, $495,974.60. Added by Transit Committee, $100,000; total estimated cost of elevated track and platforms, $595,974.60. Estimated cost of fitting up warehouses under New York approach, $348,184; price of land on Chatham street needed for approach, $17,500; total, $1,205,727.10. And for contingent expenses, $44,272.90. Grand total, $1,250,000.

The estimate of the chief engineer was supported by Comptroller Carroll, who said he was willing to pledge that it would be the last amount to be asked for, and would suffice to complete the bridge. An annual income of at least $54,000 could be expected, he said, from the warehouses to be fitted up under the arches of the bridge in New York. The report was adopted, and the committee was instructed to present the matter to the legislature.

Comptroller Campbell said that the chief engineer named March 31, 1883, as the time when the bridge would be ready for use. The bridge over Franklin square is to be put up within a month, as the iron for it is nearly ready. The time for its erection, according to the contract, has expired.

Upon motion of Gen. H. W. Slocum, the engineer were requested to keep the trustees informed from month to month of the progress of the work on the bridge. The financial statement showed that $13,543,947.19 in all had been received for the bridge, and that $13,496,393.74 had been expended.

The New Wheat Region.

The rapid settlement of the wheat lands of Dakota is perhaps the most striking feature of recent Western development. It is estimated that the farming population of the Territory has been increased fully 30,000 since the census of 1880 was taken, and the immigration of 1882 promises to be much greater than that of any previous year. A majority of the newcomers are no doubt attracted by the profits of wheat-raising. Making due allowance for the enthusiasm of new settlers and of the local journals, it appears from the census returns and from the published statements of farmers, that a yield of not less than twenty bushels to the acre can be depended on year after year, and that twenty-five bushels is not an extraordinary crop. The cost of breaking new land is said to average $1 75 an acre, of "backsetting," as the second or spring plowing is called, $1 50; of seeding, $2 50; of harvesting $2, and of threshing $1, making $8 75 per acre. After the first year only one plowing is necessary. Some statements place the cost of grain threshed and ready for market at $9 for each acre's yield; others give it as low as $6—the difference being mainly due, no doubt, to variations in the price of labor. Taking the highest estimate as a basis for calculation, with wheat at $1 a bushel, the profit of the farmer on each acre of ground cultivated, after all expenses of raising and marketing his crop are paid, cannot well fall below $10 an acre.

Where Buttons Come From.

The button trade of New York is estimated at from eight to ten million dollars a year. Last year the importation of buttons exceeded three and a half million dollars, the aggregate for the four years just passed being but a little short of thirteen million dollars. At American rates of wages many of the imported buttons could not be put upon their cards for the price they sell for.

Glass buttons are made mostly in Bohemia, and children are largely employed at the work, which they do as quickly and as neatly as adults. The children get ten cents a day, men from forty to fifty cents, and women a little less. Pearl buttons are imported from Vienna, where they are almost exclusively manufactured; and the all-important shirt buttons are received mostly from Birmingham, England, where the majority of metal buttons are likewise procured. The most extensive of all the button manufacturing, however, is that of the Parisian and Berlin novelties. In one manufacturing village near Paris, where there are from 5,000 to 6,000 inhabitants, all the working people are engaged in making the agate button, which, even with thirty per cent. duty added to the cost, sell, when imported into this country, at the extremely low figure of thirty-one cents per great gross. The material alone, it is reported, could not be procured here for double that amount.

While American manufacturers make no attempt, and probably have no desire, to compete with European producers employing hand processes, they excel in making bone, composition, brass, ivory and gold buttons by machinery, and are able to export considerable quanties of these styles. In Providence, R.I., for example, sleeve buttons and jewelry buttons are largely manufactured expressly for exportation.

Original Research in Australia.

The Royal Society of New South Wales has undertaken to encourage original research by offering eight prizes of £25 ($125) each for the best communication containing the results of original study or observation on as many specified subjects. Four of these—"On the Aborigines of New South Wales," "On the Treatment of Auriferous Pyrites," "On the Forage Plants Indigenous to New South Wales," and "On the influence of Australian Climates and Pastures on the Growth of Wool"—are to be sent in before the 30th of September next. The other four—"On the Chemistry of Australian Gums and Resins," "On the Water Supply of the Interior of New South Wales," "On the Embryology and Development of the Marsupials," and "On the Infusoria Peculiar to Australia"—must be submitted before August 31, 1883. The competition is unrestricted, and as some of the subjects may be investigated outside of Australia, the contest may be of interest to students in this country. The office of the society is in Sydney, N. S. W.

Objects of a Permanent Exhibition in New York.

A new organization—the National Industrial Exhibition Company—was incorporated yesterday, having for its object the establishment of a permanent exhibition in this city. Twelve members of the committee and a *Tribune* reporter met in a parlor of the Windsor Hotel, and listened for an hour to G. W. C. Clarke' explanation of the proposed exhibition, the articles of incorporation, and to complimentary remarks on the several names signed to the paper. Mr. Clarke spoke of the signatures as having been "obtained only after two things had been done: First, every man was requested to sign a paper expressing his willingness to become a member or trustee or a manager of the company, and then the committee used its discretion as to accepting any name on the list."

The location, it was asserted, of the Permanent Fair is to be between Central Park and the Hudson River. Work will begin at once. The site and buildings are to cost $2,000,000, although not a cent has been subscribed so far. It is the intention of the company to have a grand demonstration meeting, with one hundred speakers, or as many of them as can find time to prepare papers. It will be held at Long Branch on August 23, and several senators and lawyers and merchants have signified their willingness to be present. The objects of the company are numerous and varied, one of them being: "The purchasing, improving and acquiring real estate for residences and homesteads, and apportioning and distributing the same among the stockholders and members of this corporation." The capital stock is to be $1,000,000, divided into 10,000 shares of $100 each. While it is intended to make the exhibition a permanent one, the company has only a stated lease for fifty years. About fifty names were read, representing different trades and professions, which were added to the members of the company. It is not proposed to limit its membership.

Advancing the Prices of Glass.

PITTSBURG, March 9.—The Western Association of Window Glass Manufacturers were in session here all day, and it was resolved to advance prices from 3 to 5 per cent., according to the quality of goods. The bottle manufacturers were also in session, but no business of importance was transacted.

If you desire to keep pace with the daily progress and development of telephone matters, have a copy of the New York REVIEW OF THE TELEGRAPH AND TELEPHONE sent to your address. Only *two dollars* per annum.

Strike of the Steel Men.

The trouble which has arisen between the proprietors and employes of the Bessemer steel works at Homestead, in Pennsylvania, threatens to draw into it thousands of persons who are not in any way interested or concerned in the difficulty. At Homestead the men have struck because the proprietors find that owing to the improvements in machinery they can dispense and have dispensed with the services of a portion of their skilled workingmen, hiring in their places men who are not skilled but who answer their purposes just as well, and to whom they of course pay less wages. The cause of the sufferers has been espoused by the Amalgamated Association of Iron and Steel Workers, one of the most powerful labor organizations in the country, and a strike has been ordered in all the mills in Pittsburg in which any member of the Homestead Company is interested. The effect of this will be, unless the dispute is settled in some way, to throw upward of six thousand men out of employment, and to injure a very great industry. This would be a very great calamity. It seems to us that this is a case in which arbitration might be invoked with benefit to all concerned, and especially to the workingmen, who are less able to stand a long fight than their rich and powerful employers. The workingman is nearly always beaten in a prolonged contest of this character.—*Ex.*

Hudson River Navigation.

The Hudson River has been open for navigation purposes during the present week. Tugboats and sailing vessels have found no difficulty in ascending and descending the river. To-day the Citizens' line of passenger steamers begins its season of travel. This is an unusually early opening. A year ago the first trip was not made until the third week in March, and the earliest date on which the Citizens' line has heretofore sent out its boats was the 10th of March. The renewal of traffic and travel on the river will be a benefit to thousands of people and will be a very great convenience to business men in the metropolis, as well as in the river cities. The most important point of all, however, is that it foreshadows an early opening of the great canal which connects the lakes and the Hudson.—*N. Y. Herald*, March 9.

A recent gale uprooted a tree in Presque Isle, Lake Erie, which, in falling, dragged to the surface two skeletons, one of which is all that remains of James Bird, whose romantic story has been the subject of much sentimental poetry. The other skeleton once belonged to Edward Rankin, and the two men were shot as deserters on board the Niagara during the War of 1812. Bird fell, pierced by a dozen bullets, a moment before his pardon arrived. A much more extensive and startling exposure of skeletons was made recently in New Zealand. As an uprooted tree fell a confused heap of skeletons burst out near its roots from the hollow trunk. A more extraordinary sight, says one of the colonial papers, than this monarch of the forest lying prone, and discharging skeletons, can scarcely be imagined. Some of the skeletons, it is stated, are nearly perfect, while others are mingled in a mass of heads, hands, feet, arms and legs indiscriminately. All the Maoris in the district seem to have been unaware of the existence of this natural charnel house, and declare that the bodies must have been deposited in the tree long before their or their fathers' time.

A New Cotton Exchange in Liverpool.

The shareholders of the new Liverpool Cotton Exchange enterprise, which was started because of dissatisfaction felt by merchants at the members of the Cotton Brokers' Association undertaking to do business as merchants, instead of confining themselves to brokerage, to-day formally organized the institution, which embraces all the leading features of the New York and New Orleans Cotton Exchanges. An influential Board of Directors, numbering fifteen, was chosen, with F. Muir as president, B. F. Babcock as vice-president, and W. D. Heyne as treasurer. Among the directors are Thos. Baring and other well-known men. Large apartments have been rented in the Exchange Buildings. Two hundred shares, the first issue, have all been allotted, and additional applications have been received for 150 shares. The leading firms of Liverpool and Manchester are among the shareholders.

Spontaneous Combustion of Bengal Lights.

The author shows that the spontaneous explosion of mixtures containing potassium chlorate along with sulphur is generally due to a trace of sulphuric acid present as impurity in the latter substance, and he agrees with M. Du Moncel in rejecting the theory which ascribes such accidents to electric action.—*J. Clouet, in Journal de Pharmacie.*

The New Lights and the Old.

The revolution that is taking place in our methods of lighting is creating less stir than was anticipated. It is, however, none the less a revolution on that account. No one can say at what date the revolution will have completed itself—it is a date which the present generation may not see; but at no extraordinarily distant period we shall have changed completely the modes by which we illumine our streets and our houses. The progress of the electric light is more rapid than it was a year ago, and it is as sure as it is rapid. We no longer speak of it as a dream of scientific enthusiasts; we are, almost all of us, prepared to accept it by its new name of "the light of the future." Two or three years ago the phrase was used only in jest. Mr. EDISON, and one or two other patient workers, who were toiling in their laboratories to bring their experiments to a practical result, were laughed at, and more than one attempt was made to "write down" the schemes which they were said to have in preparation. But it was of no use. Science is not to be written down anyhow. This kind of thing has been tried ever since science took a definite shape, and it has not been in the least successful. The men themselves who were making the electric light possible for us, said very little about it. They knew to what end their labors were tending, and that in the long run the work would speak for itself; and if some acute critics thought proper to laugh at them as dreamers, why, that was the affair of the critics, and not theirs at all. And at this day we hear no more lectures on the impossibility or the impracticability of the electric light; the worst that its opponents can say of it now is that it has not yet been brought to perfection, and that it is very expensive, both of which propositions are undeniably true, only their truth need not and does not occasion us any serious inconvenience. As to the imperfections of the light, which are manifold, they are being remedied almost every day, and the expense is a matter that will adjust itself all in good time. But see how wonderfully the light has spread itself over London within the last year or two. The leading thoroughfares of the city are illuminated by it after dark, every evening, and it has found its way into the Guildhall and the Mansion House. At the ball the other evening there were not only no complaints, but universal congratulations as to the appearance of the Egyptian Hall and Saloon under the rays of the CROMPTON arc and the SWAN incandescent lamps. Ladies who went in fear and trembling, having heard that the new light was ruinous both to complexion and to costume, were delighted, and indeed it was very generally allowed that both complexions and costumes looked better far than under the yellow glare of the gas. A similar verdict has been recorded by visitors to the Savoy Theatre, where the electric light is used nightly. The effects as regards scenery, dresses, and the "human face divine," is admirable, and of course there is a considerable gain on the score of coolness. There were some objections at the Mansion house on Thursday that the atmosphere was still somewhat oppressive; but it never has been claimed for the electric light that it would preserve at an absolutely desirable temperature the air of a ball-room crowded with some eleven hundred persons in constant motion. It was not, however, denied that the temperature was more agreeable than when the gas lamps were heating the rooms to fever point. The Thames Embankment is brilliant every night with the electric candles, and several important railway stations are lighted by one or other of the new systems. The five rooms of the Royal Academy at Burlington House, which are at present devoted to the exhibition of paintings by the old masters, are lighted always at night by SWAN's incandescent lamps, the use of which has been thoroughly appreciated by the many lovers of art to whom the galleries, when accessible only in the daytime, are practically closed. A similar boon has been conferred on the readers at the British Museum, who have hitherto been debarred the treasures of that superb library during the hours of the evening. Thus even in its period of infancy the new light has shed its blessings around us.—*City Press, London.*

Another Sign of Increasing Business in England.

The return from Post Office Court, Lombard street, where the work of the Bankers' Clearing House is carried on, shows for the week ending with Wednesday last a striking diversity to that issued for the corresponding date 1881. Last year's return gave the total of the bankers paid clearing to be £134,347,000, while the figures of the past week are no less than £153,347,000. Thus £19,000,000 more has been circulated in the six days, which must indicate greater trade activity, even though a considerable percentage may be due to the increased restlessness of "bulls" and "bears" and Stock Exchange speculation in general.

Light Gold.

The question of "light gold" is again attracting attention, and a private banker in the City is collecting statistics upon it. It appears that out of 100 sovereigns and 100 half-sovereigns passed over a bank counter a few days ago only 21 and 10 per cent. respectively were of the proper weight. It is evident that this matter of "light weight" is one that needs looking to. Fortunately in the ordinary passing of sovereigns and half sovereigns their weight is not tested, and their default deducted for; but it is different when the coins are presented at the Bank of England. The State should devise a remedy.—*City Press, London.*

Where the World's Specie is Chiefly Accumulated.

At the end of the first week in February, 1882, the gold and silver bullion and specie was, as understated, in the certain leading banks of Europe and the city of New York:

Bank of France	$388,645,000
Bank of England	96,505,000
Imperial Bank of Germany	133,535,000
Netherlands Bank	42,880,000
National Bank of Belgium	20,860,000
Bank of Spain	42,315,000
Austro-Hungarian Bank	17,100,000
Swiss Concordat Banks	8,360,000
New York Associated Banks	66,600,000
Total accounted for	$816,750,000

An American School at Athens.

The committee of the Trustees of Columbia College, consisting of Bishop Horatio Potter, Rev. Dr. Morgan Dix, President Barnard, Dr. Cornelius R. Agnew, Mr. Gouverneur M. Ogden, and Mr. Stephen P. Nash, to whom the practicability of joining with other colleges in the establishment of an American school of classical studies at Athens, Greece, have reported in favor of the enterprise. President Barnard said yesterday that the scheme has been favorably considered by the Board of Trustees, and that they had decided to join on the same footing as the other colleges. "We did not consider it proper that our contribution to the school should come out of the funds of the college," said Dr. Dix, "believing that the money should be subscribed by the alumni and friends of the college, as has been done at Harvard, Princeton, Brown, and other universities."

Length of Electric Arcs.

Editor American Machinist:

In your valuable paper of March 4th, in the article "Fire Protection Against Electric Lighting," there are two statements that certainly will be new to those who have used the electric light for years. Mr. Atkinson says: "If the wire is broken the electric spark will follow from one broken end to the other from one to six feet." There are very few persons who have seen an arc more than six inches, and, no doubt, many of your readers must have thought at the first reading that Mr. A. meant inches instead of feet; but, in another part of the report, he uses the words "several feet." The danger of fire from this cause is not considered great, and with wires put up as they should be, would not begin to compare with the breaking of gas pipes and the burning of the escaping gas.

So far as the damp wood is concerned, the wires must be of very poor copper and very near together to have a "cross arc," the law being that the current will follow the best conductor.

A glance at the tables will show that copper is among the best conductors, while salt is far down in the list.

CHARLES STOWELL,
Ansonia, Conn. Electrician.

Courtesies to Scientists.

HARTFORD, CONN., March 10, 1882.

The Imperial Commission of German Scientists who will come to America to observe the transit of Venus on the 6th of December next will establish posts of observation in Charleston, S. C., and in this city. A resolution was presented in the Legislature to day extending the courtesies of Connecticut to the distinguished visitors and granting permission to erect on the State Capitol grounds a temporary building for their scientific apparatus.

Speculations in Iron.

PITTSBURGH, PA., March 10, 1882.

The outlook for the iron trade is not so buoyant as it was previous to the assembling of Congress. Conservative men are anticipating a decline in pig iron. There has already been quite a reduction in the price of rails, and $54 a ton is the price quoted now, against $64 a few weeks ago. It is a significant fact that the mines in the Lake Superior region did not advance the price of ore, notwithstanding the increased cost of labor and material, and the reason may probably be found in the expected decline in pig. It is of course inferred that the falling off in the consumption of iron, owing to the importation of blooms, will overstock the market, and though it is not to be expected that any reduction will be made in the card rate of manufactured iron, those conservative members of the Iron Association who have prevented an advance in the card are generally regarded as fully justified. It is also considered that the late advance in pig iron was wholly speculative and based on the belief that a new tariff bill would be passed by Congress at the present session.

A Herd of Sea Lions.

THE GREAT ATTRACTION OF THE CENTRAL PARK MENAGERIE — AMUSING EFFORTS TO LASSO A BIG SEAL.

Quite a throng of people stood behind the slender railing that encloses the pond and playground of the sea lions in the park yesterday afternoon, some sixteen fine specimens being then on exhibition, and watched their awkward gambols and listened to their hoarse bellowings for hours together. In the morning there were as many as twenty-five seals all told within the enclosure, but none of them, strange to say, belonged to the Central Park. Twenty-one of these were the property of Charles Reiche, for whom they were caught on the coast of the Santa Cruz Islands, 400 miles north of San Francisco, and were brought to the park on Wednesday morning to get suitable board and lodging. Here they were liberated from the crates in which they were confined on their travels, and they immediately tumbled in for a bath in the pond where the four old seals, who have been residents of the park menagerie for some time, were already enjoying themselves. They took no notice of the strangers at first, but kept on diving and splashing about as usual; but finally it was noticed that friendly feelings seemed to be established, and no collision occurred between the bull seals of either party. Six of the new arrivals were disposed of yesterday morning to the agent of the Royal Zoological Gardens, London; two to a zoological collection in St. Louis, and two to Coles' Circus and Menagerie. It was amusing to witness the efforts of the men to lasso the sea lions that were sold and had to be delivered. To lasso a buffalo or a mustang is hard work enough, but once the loop slips over the head all is plain sailing. With a seal it is different, for his neck and head run out to a point like the nose of an anvil, and no rope could possibly find a grip there. Time and again the lasso was flung at the head of one robust seal, and an effort made to entangle one of his fore flippers in the rope, but he was too slippery a customer to catch all at once, and before he was finally led into captivity he had half a dozen free plunges in the pond. Once the rope gets fairly entangled in the fore flipper the seal throws up the sponge. Those that were not disposed of yesterday will remain through the summer in the park, and will form the great magnet of the zoological collection. Mr. Conklin, the superintendent, was pleased with this addition to the seal department, as there has been so little variety of late in the attractions of the menagerie. He gives the Pacific sea lions each ten pounds a day of fish, consisting of herrings chiefly, divided into two meals of five pounds each. They bolt the fish whole, but when they are given a ten or twelve-pound codfish they wring off the head and swallow it separately from the body. They retire to sleep in a shed near the pond, and in the morning come out to take a dip. The herd is made up chiefly of females, and there is one old bull, weighing a thousand pounds, who appears to be boss, and sails around with an ever-watchful eye upon all the rest.

Subscribe for the REVIEW OF THE TELEGRAPH AND TELEPHONE if you wish to keep posted on electrical matters.

Willing to be Whipped, but Not Abused.

(From the Salt Lake *Tribune.*)

Yesterday afternoon a man from Park City came into the Clift House considerably excited, and inquired if a certain person was stopping there. He explained that the man had "done him dirt," and he was anxious to lick him. Finding that the man had just left the house, he rushed out after him, and, finding him on Tribune avenue, walked up and announced that he had come all the way from Park City to lick him, and accordingly he started in. In a few minutes he had blackened both the man's eyes, walked all over him, and reduced him to a general wreck. When he had finished the job he stood the man up against the wall of Walker's bank, and remarked:

"I want you to understand that I consider you the most infamous whelp I ever saw. You dirty little cur, I—"

"Hold on," said the man who had just been kicked, taking off his coat. "I think that after thrashing a man you've got no right to abuse him. I can stand a licking, but I won't stand abuse from any living man, no matter how much he weighs. Now, I'm going to lick you."

He was as good as his word, and started in with the most business-like air imaginable, and knocked his late victor into the gutter. Every time he got up he knocked him down, with "Blast me, I can't stand abuse." When he got all through with the Park City man, the crowd thought he was a pile of rags and mud.

"Now, look here, my friend," said the last victor; "next time you lick a man let well enough alone. Don't abuse him. You handled yourself well enough while you were licking me, but you overdid the abuse."

The number of breweries in Great Britain in 1880 was 26,114; in Germany, 23,940; in the United States, 3,293; in France, 3,100; in Belgium, 2,500; in Austria-Hungary, 2,297; in Holland, 560; in Russia, 460; in Norway and in Switzerland, 400 each; in Denmark and Sweden, 240 each. The quantity of beer produced in Great Britain was about 49,000,000 hectolitres (the hectolitre is equal to about twenty-two gallons); in Germany, about 37,000,000; in the United States, 14,000,000; in Austria-Hungary, 11,000,000; in Belgium, 8,000,000; in France, 7,000,000; in Russia, 3,000,000; in Holland, 2,000,000, etc. Russia has the largest breweries, and there is an average production of 6,950 hectolitres in each, Denmark being credited in this respect with 6,250 hectolitres to each brewery; Austria Hungary, 4,770; the United States, 4,182; France, 2,355; Great Britain, 1,900; Germany, 1,550. Norway has the smallest breweries, with an average of 1,300 hectolitres.

The following are the figures of the weekly bank averages of the banks in this city to-day, compared with last week and the corresponding week last year:

	Mar. 4. 1882.	*Mar.* 11, 1882.	*Mar.* 12, 1881.
Capital.....	$62,637,700	$62,637,700	$62,037,700
Loans.....	320,677,800	318,715,800	298,485,400
Gold.....	53,279,800	55,888,500	54,894,100
Greenbacks.	16,770,600	16,310,000	13,289,200
Deposits....	290,673,800	286,042,700	274,442,600
Circulation..	20,026,200	19,990,600	15,448,500
Reserve.....	*2,618,000	688,800	*427,300

*Below the line of 25 per cent. to deposits.

The increase of $3,305,900 in reserve since last Saturday brings the banks within the 25 per cent. line.

About 105,000,000 of standard dollars have been coined in this country up to this date, which, if valued at the rate at which silver is valued in the cash reserve of the Bank of France, to the extent of about $226,435,000 on the 23d of last month, would be worth $108,215,000.

Telegraphic and Telephonic Notes.

The Telephone in England.

Mr. Fawcett, Postmaster-General, has authorized a telephone company in Lancashire to establish an exchange system for general public use at ordinary telegraphic charges. The *Times* says: "We assume that this indicates that the Government, having formally vindicated their rights, are prepared to grant reasonable terms to existing companies."

THE MICROPHONE AND SONOROUS VIBRATIONS.—M. Serro-Carpi has described to the Académie Française a method of determining the nodes and ventral segments in vibrating columns of air. He lowers a small microphone down a sonorous pipe, and by means of a telephone connected to the microphone is able to determine the difference between the sounds when a ventral segment or a node of the vibrating column of air is transferred.

The pooling agreement between the cable companies will be of benefit to the Western Union. The American Cable Company will give either $1,000 in common and $1,000 in preferred stock, or $1,000 in common stock and $1,000 in a bond for each $1,000 subscription.

The Western Union.

ISSUE OF THE QUARTERLY REPORT—THE COMING DIVIDEND.

The quarterly report of the Western Union Telegraph Company for the quarter ending December 31 contains the following statement:

Surplus October 1, 1881, as per last quarterly report		$629,759 91
Net revenues, quarter ended December 31, 1881		1,731,235 09
Total		$2,360,995 00
From which, deducting appropriations for:		
Dividend of 1½ per cent. paid January 16	$1,199,341 50	
Interest on bonded debt,	106,380 24	
Sinking funds	20,000 00	$1,325,721 74
Leaves a surplus January 1, 1882, of		$1,035,273 26

This statement closes the last quarter of the first year's operations of the company since taking up the American Union and Atlantic and Pacific Telegraph Companies with the following results for the calender year 1881:

Gross revenues	$16,868,396 24
Expenses	9,489.269 05
Net profits	$7,379,127 19

In view of the preceding statements, the committee recommend the adoption by the Board of the following:

Resolved, That a dividend of one and one-half per cent. be and is hereby declared payable on the 15th day of April next to stockholders of record at the close of business on the 18th day of March, instant.

Resolved, That, for the purpose of such dividend, the stock books of the company be closed at three o'clock on the afternoon of the 18th day of March, instant, and be reopened on the morning of the 17th of April next.

The People's Telegraph Company has been formed to build a six-wire line from Washington to New Orleans. Mr. H. A. Packer, of the Lehigh road, is said to be the principal promoter of the enterprise.

The Atlantic Cables.

LONDON, March 11.—In answer to inquiries concerning the announcement by the *Daily Telegraph* that an arrangement had been arrived at between the Anglo-American Cable Company and Mr. Gould's new cable company for a more satisfactory working of the lines, the manager of the Anglo-American Company says he has nothing to communicate, and that when there is there will be an official announcement. The matter, he says, is not in a position to be made public, as nothing is definitely settled.

Telegraphic Progress in England.

Lecturing recently on "Electricity and the Electric Telegraph," at Kensington, Mr. Robert W. Johnston, Postmaster of the Eastern Central or "City" district, quoted some of the statistics of the Postal Telegraph which are interesting and instructive at the present moment. He showed that whereas the earliest telegraph of which we have any account required a separate wire for each letter of the alphabet, and that in the first really practical telegraph two wires were necessary for the transmission of a single message, as many as four messages can now be sent on a single wire at the same time—that the 6,000,000 telegrams forwarded by all the companies in their palmiest days had increased to more than 31,000,000 forwarded by the Post Office last year, and that whereas it might be remembered when the charge for a message from Edinburgh to London was something like 12s. 6d., it was now possible to telegraph from Scilly to Shetland, or from Jersey to John O'Groat's for 1s. Fifty thousand miles of wire in 1870 had increased to considerably more than 100,000 in 1882; 2,200 instruments worked by all the companies had increased to nearly 9,000 worked by the Post Office; and 2,500 telegraph offices under the old *regime* had increased to more than 5,500 under the new. Four thousand persons of all classes, employed by the companies had increased to nearly 12,000 employed by the Post Office, and of these 1,600 were women, of whom 600 are employed in the Central Telegraph Office alone. As to the transmission of news for the press, the Post Office had converted into an attractive monopoly what used to be a rather repulsive combination on the part of the old telegraph companies, and on one occasion quite recently as many as 700,000 words, equal to 350 average columns, had been transmitted from the Central Office alone. The lecture, which was of a thoroughly popular character, was illustrated by specimens of most of the instruments in use by the Post Office, as well as by a working model of the pneumatic tube system, telephones in circuit, and some minor experiments with the electric light.

SOUNDING-BOARD TRANSMITTER.—If a sound is produced at a certain distance from the sounding board (*? table d'harmonie*) of a piano, it is known that this board, as well as the strings which are in unison with the sound produced, or with one of its harmonics, enter into vibration. The author finds, on applying a microphone to such a board, that the sound transmitted in a circuit containing a telephone is considerably strengthened without any alteration either in its distinctness or in its quality, and upon this principle he has constructed a very sensitive transmitter.—*M. Bourbouze.*

Mutual Union Suit.

In the suit of Pliny H. Babbitt against the Mutual Union Telegraph Company a bill was filed yesterday in the United States Circuit Court by the plaintiff, in which he asks that a number of interrogatories may be answered, among which is the following: "Whether the capital stock of the company has not been increased to $10,000,000?" He also asks for a perpetual injunction restraining the defendants from issuing any more capital stock than that which amounts to $1,200,000. Plaintiff's counsel are Mr. Roscoe Conkling, Mr. Daniel H. Chamberlain, and Mr. Julien T. Davies.

Canadian Telegraph Lines.

MONTREAL, March 9, 1882.

A suit was taken here to-day in the Superior Court in the name of the Attorney General of the Province for a writ of quo warranto for the appointment of a sequestrator to the Montreal Telegraph Company in order to liquidate and wind that company up. The object is to follow up as closely as the law will permit the judgment of Judge Rainville, which some weeks ago declared the agreement between the Montreal Telegraph Company and the Great Northwestern Company ultra vires. This agreement gave the control of the Montreal company's franchise and business over to the Great Northwestern, upon the Western Union guaranteeing that company's promise to pay the Montreal company's shareholders eight per cent. per annum. As matters stand at present the hope of the prosecuting litigants is that the appeal taken against Judge Rainville's judgment will be dismissed. They want the sequestrator to stand ready to act for the shareholders in such an emergency. Meantime the Great Northwestern Company is seeking Parliamentary legislation to legalize that which Judge Rainville's decision has declared to be illegal. Many regard the new litigious movement as taken in the interest of the Canada Mutual Company, but the authorities of the latter deny this. However that may be, Parliament will likely refuse to interfere in a question awaiting judicial decision. Should the appeal be dismissed an entirely new deal will be necessary to give the Western Union control over the Montreal Telegraph Company.

Utility of the Telephone.

The telephone was used to good purpose yesterday on several occasions and may probably have been the means of saving life. When Mr. Carson's little child was discovered in the rain barrel unconscious, Dr. Lewis office was called, but the doctor being out, Dr. Jones was summoned through Leadbeater & Bros.' drug store, and in a short time arrived and succeeded in bringing the child, who was thought to be dead, back to consciousness.

A number of arrests have also been made by the police station receiving instantaneous information by telephone.—*Alexandria Gazette.*

We have to record daily instances of the invaluable service rendered by telephonic communication similar to the above, and the thanks of the community is certainly due to the ever watchful and efficient management of the Telephone Exchanges, for their promptness and dispatch.

A cable despatch from London says: "It appears to be true that some proposition looking to a joint purse arrangement will be made to the Board of Directors of the Anglo-American Cable Company at its meeting to-day, but it is doubtful whether matters are far enough advanced for anything to be published." We understand that the proposition referred to is that the American company shall receive 22 per cent. of the gross receipts of all the companies. This would yield it about $1,000,000 a year net profit, or sufficient to pay 6 per cent. dividends on $10,000,000 preferred stock, and 4 per cent. on a like amount of common stock. The subject is under consideration by the directors of the American company, along with that of constructing a cable to Brazil, and the choice between issuing bonds or preferred stock, but no decision has yet been reached. The steamer

Faraday, having on board 600 miles of the second cable of the company, arrived at Halifax to-day, after being two months at sea waiting for the ice to break up, so that the laying of the cable could be completed.

Pennsyvania Railroad.

The report of this company for 1881 covers, as usual, the lines worked directly, which are as follows:

1. The Pennsylvania Railroad Division, including the main line from Philadelphia to Pittsburgh, 358 miles, with 812 miles of branches, 1,170 miles in all; an increase of 50 miles of branches.

2. The United Railroads of New Jersey Division, including the main line from Jersey City to Philadelphia, 89 miles, and 341 miles of branches; also, the Delaware & Raritan Canal, 66 miles, in all 430 miles of railroad and 66 of canal; an increase of 28 miles.

3. The Philadelphia & Erie Division, a main line from Sunbury, Pa., to Erie, 288 miles.

A total of 1,888 miles of railroad and 66 of canals, the earnings of which were as follows:

I. PENNSYLVANIA RAILROAD DIVISION.

	1881.	1880.	Inc. or Dec.
Gen. freights...	$21,229,200.85	$20,234,046.44	I. $995,154.41
Mis. freights...	170,918.96	278,347.54	D. 107,428.58
First class pass.	4,702,753.44	4,110,797.68	I. 591,955.76
Emigrant pass.	320,631.30	326,348.97	D. 5,517.67
Adams Express	442,466.31	351,812.06	I. 90,654.25
U. S. mails.....	479,086.97	371,276.56	I. 107,810.41
Mis. passengers	106,491.46	99,742.59	I. 6,748.87
Rents.....	195,451.50	215,285.78	D. 19,826.28
Total earn....	$27,647,008.79	$25,987,657.62	I. $1,659,351.17
Conduct. trans..	5,705,010.31	5,319,345.75	I. 385,664.56
Motive power...	4,379,351 54	4,003,728.41	I. 375,623.13
Maint. of cars..	1,650,519.97	1,805,747.07	D. 155,227.10
Maint. of way..	3,201,214.74	2,488,729.18	I. 712,485.56
Gen. expenses..	532,372.04	433,935.37	I. 98,436.67
Total ex.	$15,468,468.60	$14,051,485.78	I. $1,416,982.82
Net earnings...	$12,178,540.19	$11,936,171.84	I. $242,368.35

II. UNITED RAILROADS OF NEW JERSEY DIVISION.

	1881.	1880.	Inc. or Dec.
General freights....	$7,152,710 78	$6,385,410.17	I. $767,300 61
Mis. freights.....	176,744.45	132,338.36	I. 44,406.09
First-class pass.....	4,531,868 57	4,101,582 05	I. 430,286.52
Emigrant pass.....	72,038.99	60,930.85	I. 11,108.14
Adams Express.....	303,174 37	265,093.49	I. 38,080.88
U. S mails	194,605.64	136,598.25	I. 58,007.39
Miscellaneous pass..	50,645 46	43,298 00	I. 7,347.46
Del. & Raritan Canal	541,076 73	419,430.47	I. 121,646.16
Total earnings....	$13,022,864.99	$11,544,681.74	I. $1,478,183 25
Conducting transportation.....	4,704,054.12	4,090,060 71	I. 613,993.41
Motive power.....	2,036,265.65	1,757,604.26	I. 278,661.39
Maintenance of cars.	584,106.48	526,004.72	I. 58,101.76
Maintenance of way	1,181,437.31	1,440,154 43	D. 258,717.12
General expenses....	73,103.30	70,040 36	I. 3,062.94
Canal expenses.....	232,314 17	331,343.53	D. 99,029.36
Total expenses ...	$8,811,281.03	$8,215,208.01	I. $596,073 02
Net earnings.....	$4,211,583.96	$3,329,473.73	I. $882,110.23

III. PHILADELPHIA & ERIE DIVISION.

	1881.	1880.	Inc. or Dec.
General freights....	$2,746,609.37	$3,130,835,38	D. $384,226.01
Mis. freights.....	96,263.05	97,494.54	D. 1,230.19
First-class pass.....	532,967.02	424,674 84	I. 108,292.18
Emigrant pass.....	6,850.41	6,080.75	I 769.66
Express	36,351.42	31,582.68	I. 4,768.74
U. S. mails	27.047.96	26,481.45	I. 566.51
Miscellaneous pass..	8,219.82	10,583.49	D. 2,363.67
Total earnings...	$3,454,309.05	$3,727,733.13	D. $273,424.08
Conducting transportation.....	777,999.74	763,917.27	I. 14,082.47
Motive power.....	718,758.74	703,477.00	I. 15,281.74
Maintenance of cars	278,411.49	274,425.50	I. 3,985.99
Maintenance of Way	654,890,33	616,534.01	I. 38,356.32
Total expenses ...	$2,430,060.30	$2,358,353.78	I. $71,706.52
Net earnings.....	$1,024,248.75	$1,369,379.35	D. $345,130.60

State Railroad management is not likely to suffer for want of criticism. A Melbourne newspaper is not pleased with the railroads in the colony of Victoria, and expresses itself with something of the frankness of the American editor whose pass has not been renewed. Not to speak of graver faults, it says that the carriages are inconvenient, the stations comfortless, the clerks and porters uncivil, the fares unequal, the luggage arrangements irritating, the refreshments disgusting, and complaints unavailing. Moreover, it declares that all the gate-keepers on the line are crippled, blind, deaf or paralyzed—or all four at once. It should be borne in mind that the railroads in Victoria belong to the government and are worked by the State. Not that this accounts for their being bad, but that it may account for the very bad opinion of them expressed by a newspaper opposed to the administration. The maimed, blind and paralytic gate-keepers of which it complains evidently do not vote with its party. When that party is in power it will have much to say in praise of Victoria railroads and its polite and accommodating clerks and porters, no doubt; but then we shall get the same complaints from the organs of the other party. Imagine the New York Central road worked by the State, with a Democratic or Republican party boss as General Manager, and his appointees as his employes. We will not say what the management would be, but we venture to say that it could not be so good that the opposition newspapers would not find it horrible. By the way, the recent declaration of Prince Bismarck, that all government employes are bound to support the government candidate at the elections, must be a pretty hard dose for the 150,000 or so of the Prussian state railroad employes to swallow, the more so as a very large portion of them have very recently become state employes, being transferred with the railroads which the state has lately bought, and of course being of all kinds of politics. For that matter, however, there has been no regard to politics in forming any of the Prussian civil service corps heretofore.

A New Electric Current Meter.

At the Physical Society on January 28, Mr. C. Vernon Boys read a paper on an apparatus for measuring the strength of an electric current, which so far as we are aware is highly original. The rate of a pendulum clock depends on gravity and is proportional to the square root of the strength of gravity. The rate of a watch depends on the strength of the hair spring, and is proportional to the square root of the hair spring. The force due to a current passing through any combination of wires and iron is proportional to the square of the current strength. If then any of the parts of the combination are arranged so that they vibrate under the influence of an electro-magnetic force, the speed of vibration will be simply proportional to the current strength, because the square of the speed measures the force and the force is proportional to the square of the current. Let such a contrivance take the place of the balance or pendulum of a clock, and the clock will become a measurer of the quantity of electric current instead of time. In order that the indications should be true, either the maintaining power must be so contrived that the amplitude does not vary much, in which case it does not matter what the law is connecting the force with the displacement, or the parts must be so arranged that the force is directly proportional to the displacement, in which case it does not matter what the amplitude is. The two important points, therefore, are the controlling and the maintaining powers. Mr. Boys showed several ways of producing a controlling power. In the first case, which was a combination of two solenoids, one moving through the interior of the other, the force will, if they are properly arranged, be proportional to the displacement. As there is no iron in this arrangement it will apply to the case of alternating currents. In another case a small armature is mounted on a balance staff, and around it are the two poles of an electro-magnet which forms part of the circuit. Another form is unaffected by residual magnetism. In it two crescent-shaped pieces of iron forming the sides of the balance pass through two fixed solenoids. The iron pieces are carried by a cross arm mounted on a vertical spindle, and they serve to form sectors of a circle like the balance wheel of an English lever watch. By passing the current through the coils the cores are attracted into the latter, and if the current diminishes or increases in strength the cores will retire or advance within the coils. In all these cases the direction of the current is of no consequence. The maintaining power may be an ordinary escapement driven by clockwork in the usual way. In this case the amplitude will be less with a stronger current; but this drawback may be overcome by the use of an electro-magnetic *remontoire*. The maintaining power can, however, be independent of clockwork if an impulse is given to the electricity at each swing of the balance. Mr. Boys exhibited a meter constructed on this principle for him by Messrs. Elliot Brothers. The controlling power in it depends on iron crescents mounted like parts of a watch balance wheel on a vertical spindle, and each enclosed by a pair of solenoids consisting of a primary and secondary coil. The main current runs through the primary solenoids, but a portion of it is diverted through the secondary solenoids when the balance is its neutral position, at which time a variation of the current in the controlling solenoids has no effect in disturbing the period of an oscillation. To regulate meters of this class a weigher is screwed outwards or inwards according as the meter goes too fast or too slow. As this meter depends on dynamical principles alone, and is independent of gravity, it must work equally well wherever it is planted.

Incidents in Peru.

A private letter, written from Callao, Peru, contains the following interesting accounts: "We are in the middle of summer here now. Strawberries and all other fruits are in market, as well as all of our summer vegetables. As for the flowers, I wish you could see them, they are magnificent! The roses particularly are superb, and very cheap. You can get an excellent bouquet for fifteen cents; in fact, everything is cheap here. The Peruvian money since the war has depreciated frightfully; in fact, with a $20 gold piece of our money you can get $340 of the Peruvian paper money, and in selling their goods, the merchants do not make a proportionate allowance. Thus, you see, I went to the opera the other night and had one of the best seats in the house, for which I paid $10 in their money, or just sixty cents in our money. Everything else sells in proportion. The battle-field of Chorilloo, where the Peruvians and Chilians fought the decisive battle of their war, is about fifteen miles from here, and last week I went up in the train to visit it. Imagine to yourself, if you can, a vast plain, where twelve thousand men were killed, the majority of whom were not buried (about eight thousand were not), but allowed to lie on the top of the ground and rot, until the action of the elements and the vultures, of which there are thousands, destroyed them. As you wend your way across the scene of the conflict, as far as the eye can reach you see nothing but skeletons in tattered uniforms, piled up in places and scattered about in others. Here you find the skeleton of a Peruvian officer, with his men lying all around him, and further on, perchance, you will come across the remains of a company of Chilians. So the scenes vary. One thing we saw was particularly suggestive. As we walked along we came to a little knoll; on the side of it lay the remains of a soldier; his head was resting upon a stone as if on a pillow; one arm was bent so that the hand was on a line with his face, and clutched tightly in the bony fingers was the picture of a young baby. So he died, poor fellow. It was a touching sight, and to me suggested a train of thoughts. If I knew anything of his family I would have taken the portrait and sent it to them, but it would of course be an almost impossible task to find them."—*Forney's Progress.*

It is reported that General Manager Thomson will be made third Vice-President of the Pennsylvania Railroad Company.

An exchange says: "Gas is all right in the main, but gets all wrong in the meter."

NEW PATENTS—1882.

INDEX OF INVENTIONS FOR WHICH LETTERS PATENT OF THE UNITED STATES WERE GRANTED IN THE WEEK ENDING FEBRUARY 21ST, 1882.

Electric Machine, dynamo, W. E. Sawyer....254,056
Electric Wires, safety device for, S. M. Plush. 254,099
Electro Magnetic Relay, C. A. Randall.....254,045
Lamp, electric, H. S. Maxim.....254,032
Lamp, electric, G. W. Sawyer.....254,055
Lamp, electric, E. Thomson.....253,958
Lantern for Electric and other Lights, L. Stierenger.....253,955
Telegraphic Apparatus, B. Thomson and C. Selden.....253,957
Telegraphic Receiving Instrument, G. Smith. 254,061
Telephone Call Register, W. J. Denver and W. W. Sawyer.....253,853
Telephone Station Apparatus, G. W. Coy....253,912
Telephone Switch, automatic, J. B. Odell....253,941
Telephone Transmitter, carbon, G. D. Clarke. 253,977

FOR WEEK ENDING FEBRUARY 28TH, 1882.

Electrical Switch Board, C. E. Scribner.....254,389
Telegraph Line, underground, D. Brooks....254,268
Telegraph Quadruplex, S. D. Field 254,297
Telegraph Sextuplex, F. W. Jones..... 254,220
Telephone Line Signal Call, F. R. Richmond. 254,155
Telephone Transmitter, E. Berliner.....254,190
Lamp, electric, F. H. Beers 254,261

Recent patents taken out in Great Britain will appear in next issue, as they were not received in time for publication in this edition.

Recent Inventions.

A novel mechanical musical instrument has been patented by Mr. Azro Fowler, of New York city. This invention relates to wind musical instruments that are operated manually by keys, or are played or controlled by means of one or more sheets or strips of paper or other suitable material perforated to represented the different notes or sounds it is desired to produce, and caused to automatically pass over air ducts, which, according as they are opened by the perforations in the paper, cause the reeds or other sounding devices to be played as desired; and the invention has special reference to the pneumatic action of the instrument.

In the manufacture of turpentine the crude article containing chips, bark, twigs, and other foreign substances is introduced directly into the still, and in the process of distillation the extractive coloring matter of these substances discolors the residual rosin, thereby depreciating its commercial value. Much time and labor are also spent in dipping or straining the chips, &c., from the liquid rosin, and the fire risks are greatly enhanced by the taking fire of the hot saturated chips as they are removed from the still, most of the conflagrations of turpentine stills originating from this cause. Mr. Allen Garner, of Americus, Miss., has patented an apparatus for the manufacture of turpentine and rosin which will avoid these difficulties, and will economize time and labor and lessen the costs and risks in distilling turpentine. and will produce a cleaner and more valuable rosin.

A case for clocks which is unaffected by heat, and which is practically dust-proof, has been patented by Mr. John G. Raine, of Grand Island, Neb. This clock case is intended particularly for clocks used on locomotives and in similar places.

An instrument for training and strengthening the muscles used in writing, for the use of learners, and also to correct bad habits of penmanship, has been patented by Mr. Horace Forbush, of New York city. The invention consists in a spring slide provided with a handle for being held, and fitted so as to be moved in a manner similar to writing, and to enforce correct position of the operator's hand.—*Scientific American.*

Invalidation of Patents by Public Use.

In nearly all foreign countries, if an invention is brought into public use before the application for a patent is filed, the patent will be rendered invalid. In this country the same rule holds, except that no invalidation of the patent will take place unless the invention was in public use for more than two years prior to the application for a patent. This law is inexorable, and the Supreme Court of the United States has held that a single instance of such public use, two years prior to the application for patent, is enough to defeat the patent.

The law applicable to the case is section 24 of the act of July 8, 1870, now embodied in the Revised Statutes as section 4,886, which declares:

"Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country before his invention or discovery thereof, and not in public use or on sale for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceedings had, obtain a patent therefor."

An interesting case that came under this section of the law was that of Worley *vs.* the Loker Tobacco Company, lately decided by the United States Supreme Court A patent was granted to Worley & McCabe, August 22, 1876, for a mode of finishing plug tobacco. The invention consisted in heating the plugs of tobacco up to 140°, while they were between metal plates in a press, subject to heavy pressure. The pressing between plates and the heating had been previously done, but separately.

It appeared from the testimony that Worley made the invention for his employer, McCabe, who was the owner of a tobacco factory in St. Louis; and that the invention was there in public use for more than two years before any application was made for the patent. The court said:

"It has been repeatedly held by this court that a single instance of public use of his invention by a patentee for more than two years before the date of his application for his patent will be fatal to the validity of the patent when issued. (*McClurg vs. Kingsland*, 1 How., 202; *Consolidated Fruit Jar Company vs. Wright*, 94 U. S., 92; and *Egbert vs. Lipman*, decided at the present term.) We think the testimony of the appellants themselves shows such a public use of the process covered by Worley's patent as to render it invalid. This evidence brings the case clearly within the terms of the decision of *McClurg vs. Kingsland*, (1 How., *ubi supra*), where it was declared that if a person employed in the manufactory of another, while receiving wages, makes experiments at the expense and in the manufactory of the employer, has his wages increased in consequence of the useful results of the experiments, makes the article invented, and permits his employer to use it, no compensation for its use being paid or demanded, and then obtains a patent for it, the patent is invalid and void. The inventor cannot relieve himself of the consequences of the prior public use of his patented invention by assigning an interest in his invention or patent to the person by whom the invention was thus used."

The decree of the Circuit Court, which held the patent to be invalid, was therefore affirmed.

The House Committee on Patents directed Representative Springer to report favorably a bill authorizing the Secretary of War to purchase the patent rights of Addison N. Sawyer for canister shot, and appropriating $250,000 for the purpose.

Our next edition will be over 6,000.

Professor J. A. Berly, C. E., B. A., A. S. T. C., etc., has just completed his new edition of the Electrical Directory and Advertiser of England, which is one of the most valuable works of the kind published. It is a publication very much in demand, and its appearance just now is very timely. Those desiring the book can be supplied by Professor Berly, 16 New Bridge street, London, E. C., England.

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If it is true, as asserted, that 300 to 1,500 lives and $5,000,000 to $7,000,000 of property are lost every year because of defective danger signals, it will be criminal in Congressmen to refuse any legislation which can increase the safety of navigation in waters covered with fog. A scheme has been urged for years which is to establish an international standard for signals. A uniform signal service ought to be perfected and adopted throughout the whole world as soon as possible.

Mr. James M. Hendershot, of Atchison, Kan., has patented a flexible spout for loading cars with grain from grain-elevators, and of the particular construction and arrangement thereof in connection with a wooden spout leading from the elevator. The spout or conduit is made of rings tapering, or sections hinged together in sets, the hinges of the sets being arranged on different diametrical lines of the spout.

A gigantic seaweed grows on the coast of India, and has sometimes been mistaken for a sea serpent. Captain Taylor, Master Superintendent at Madras, relates that about fifteen years ago, while his ship was anchored in Table Bay, an enormous monster, as it appeared, was seen drifting, or advancing itself around Green Point, into the harbor. It was more than 100 feet in length, and moved with an undulating, snake-like motion. Its head was crowned with what appeared to be long hair, and the keen-sighted among the affrighted observers declared that they could see its eyes and distinguish its features. The military was called out and a brisk fire poured into it at a distance of about 500 yards. The creature becoming quiet, from the apparent effect of its wounds, boats went off to examine it and complete its destruction, when it was discovered to be seaweed.

The people made destitute in Arkansas by the floods number 17,920 and the sufferers in the whole Mississippi Valley probably exceed 100,000. Gen. Hancock returned from the South with his mind filled with distressing scenes of devastation and misery, but the picture he saw does not express the woe which the swelling floods have since then wrought. The misery resulting from the forest fires in Michigan did not appeal to the sympathy of the nation more urgently than does the suffering produced by the unprecedented floods of the Mississippi, and contributions for the relief of the unfortunates should be both prompt and generous.—*Mail and Express.*

POST OFFICE TELEGRAPHS OF GREAT BRITAIN.—The accounts of the Post-Office telegraph service for the year ended March 31, 1881, have just been issued as a Parliamentary paper. It appears that the revenue for that year amounted to £1,633,866, while the working expenses in salaries, wages, maintenance, &c, were £1,181,324, and £12,102 were contributed to a depreciation fund to replace submerged cables, leaving a balance of £440,460. This balance is equal to 4.13 per cent. on a capital of £10,655,371—the total amount of the capital account down to March 31, 1881.

Miscellaneous Notes, Facts and Aphorisms.

Diversity.

Other people have their faults,
And so have we as well;
And all ye chance to see and hear
Ye have no right to tell.

Aye! let us hold our tongues in check,
At all times given to running,
Nor take such pains to ferret out
Our neighbor's lack or cunning.

Some wear their blemishes outside
The real man or woman,
While others hide them if they can;
Yet all alike are human.

The rose that bears the sharpest thorn
Is oftentimes the sweetest;
So stern, decisive souls have proved
The truest and completest.

And he who seems to shed no tears
Of sorrow for another
May be the very one whose hand
First lifts the fallen brother.

Be not deceived by outside show;
Doubt not, too soon, a neighbor,
Because he chooses in his way
To live and love and labor.

Diversity of thought and mind
Shines in each path of duty;
Diversity to God's great plan
To make a world of beauty.

A Georgia Railroad has had to pay $5,000 to a man who was put off a train last summer for sitting in his shirt-sleeves in the "ladies' car." The conductor told him it was impolite, but he had contrary views on the subject. The conductor, who evidently thought himself responsible for the conduct of the passengers, as well as of the train, enforced, with the help of the brakemen, his own standard of social propriety, by ejecting him from the train; but a Georgia jury put a high price on the privilege of teaching etiquette to railroad travelers.

There are at present in the Old World and the New World more than 100,000 railway locomotives. Their total force is equal to 30,000,000 horse power, and all the other steam engines on the globe are estimated at 46,000,000 horse power. The technical "horse power," however, is really equal to three average horses, and each horse to about seven men; the aggregate power, therefore, of all the engines being vastly more than the effective force of all the human workers living. Four-fifths of the steam engines now at work have been made within a quarter of a century or so.—*American Inventor.*

The production of tea in Japan is steadily increasing, and now reaches over 90,000,000 pounds annually.

The San Francisco *Call* says: "It is announced that a herd of 11,000 sheep has just arrived at Lincoln, Neb., from Washington Territory. The journey has occupied two years. The trail from Washington Territory to the Missouri River is said to be the longest and hardest known to stockmen. Three years is often consumed in a drive over this distance.'

In Germany there are 23 car-works, which together can turn out from 21,000 to 25,000 4-wheel freight cars yearly, if wholly engaged in such work. Most of the works, however, also construct passenger cars, street cars, turn-tables, etc.

An English form of phrasing was oddly illustrated in a depot the other evening, when a traveling British cousin was overheard asking another, "Have you got the brasses for the luggage?"

Ridicule is very much stronger than argument. Many a man who can't be overcome by argument can be made, as the Irishman said, "to stand prostrate before the victor" by a sharp turn of wit "What I want," said a very pompous debater, "is just a grain of common sense in this matter." "Well," retorted his opponent quickly, "it will require the efforts of a special Providence to give it to you."

A correspondent wants to know where the expression "Let up" comes from. We believe it comes from the fellow who isn't on top in the fight.—*Philadelphia Sun.*

The New Orleans *Picayune* believes that psalm tunes should be played on an upright piano; which suggests that Masonic music should be played on the square.—*Boston Commercial Bulletin.*

The editor of the Sauquoit (N. Y.) *Register* suggests that persons sending in big eggs will please accompany them by several ordinary-sized ones, not for publication, but as a guarantee of good faith.

About forty-eight millions of dollars was spent last year in the construction of buildings in New York, the exact sum being $47,784,670. Never before was the building trade in the city so active, and never before was so much money put in new erections during a single year.

An amateur was chaffering about the price of a table service in Dresden china. "But it is much too dear! There is not a single piece in it which has not been mended." The dealer has his answer pat. "My dear sir," he says, why, "that is the very thing that makes the set valuable. This is the table service that Bonaparte broke when he kicked over the preliminaries at Leoben!" The amateur, a little taken aback by this thrust, says: "Are you perfectly sure of that?" "Certainly I am. Would you like the same service without its being mended? I have that also."

An affidavit is generally pretty dry reading, and, if there is anything ludicrous in it, it must be by accident. The following, however, is suggestive of the possibility of humor even in a law document: "The prisoner set upon me, calling me an ass, a scarecrow and an idiot, all of which I certify to be true."

A great many of us are in the position of the Irishman, who, when told that he had an upright judge to try him, replied: "Ah, Biddy, it's not an upright judge I want, my darlin', but one that will lean a little to my side."

The strike at the Pittsburg iron mills has ended in the triumph of the Amalgamated Association, which ordered it in eight of the largest mills. In the Bessemer Steel Works at Homestead the workmen are also victorious, the company giving up their attempted prohibition of union men from employment, and also renouncing their effort to reduce wages. The steel and iron mills of the region will therefore be busy again this week.

While the country is prosperous and the people free from alarms and anxieties, Wall street seems to afford ample encouragement for all the croakers, liars, rumor mongers and idiots that are in need of jobs of work.

The House Committee on Printing agreed to report to the House favorably Mr. Springer's joint resolution providing for the publishing and distribution of 7,000 copies of the first three volumes of the official records, Union and Confederate, of the late war.

Electric lights are being put in the House of Representatives at Boston.

There can be no possible harm in a good-natured laugh. Indeed, it is just as truly a duty to look for the pleasant side of life, and while looking to laugh at the rollicking humor which it sometimes displays, as it is to see its more serious and sombre side. The man who honestly believes that he is always walking through a vale of tears either has the dyspepsia or else has got hold of the wrong end of religious conviction. The poet says:

This life is not all sunshine,
Nor is it yet all showers;
But storms and calms alternate,
As thorns among the flowers.
And while we seek the roses,
The thorns full oft we scan;
Still let us, though they wound us,
Be happy as we can.

The first prize of the Algerian lottery, which was drawn a few days ago in Paris, has been gained by ten workmen of the Marseilles firm, "La Ménagère Marsellaise," who had clubbed together to buy five tickets. They thus gained 500,000 francs. They arrived together from Marseilles, and presented the ticket bearing the winning number, and each of them received a cheque for 50,000 francs; but they asked that the cheque should only be payable at the Marseilles branch of the Bank of France. A friend of theirs, M. Marius, had chosen the five tickets for them in a tobacconist's in the Rue de Paris. Two of them only still work in the manufactory; the others have left it and intend to fit up a business of their own.—*La Patrie.*

London *Truth:* "A young friend of mine was dining with his father a few nights ago. 'George,' said the fond parent, when they next met, 'you took my overcoat instead of your own, and I regret to say I found the pockets of your coat full of cigarettes and matches.' 'I discovered my mistake, father,' replied the son, 'directly I got outside, for I found the pockets of the coat I had on contained chocolate creams and three pairs of ladies' gloves.'"

A bill has been introduced in the Legislature at Albany making it a misdemeanor to use corn, rice, corn starch, potato starch, cocculus indicus, or hops bleached with sulphuric acid, in the manufacture of ale, beer, porter, or other malt liquor. This may displease those manufacturers who insist that some of these substances are good for giving body, tone, color, or other properties to the liquors they fabricate. But probably their customers would consent to part with all these extras, and to be satisfied with liquor brewed out of the old-fashioned materials.

The announcement of the Pennsylvania Railway that the Philadelphia line of steamships for Europe can no longer look to it for support, is a blow at the pride of Philadelphians. The abandonment of the unprofitable line would be a discouraging event for the nation, since the restoration of American shipping would seem more hopeless than ever before.

The consumption of tobacco in Mexico, where everybody smokes—the senorita in her reception room, as well as the boy of five summers—is immense. In the principal factory at Orizaba more than 11,000,000 packages, each containing thirty cigarettes, were manufactured during the last year, and more than 12,000,000 cigars left the same building. As the duty on tobacco is light, the luxury of smoking tobacco absorbs little of the consumer's income.

Twelve thousand people have left Hamburg for the United States during the past two months. Germany will have a great many liens on this country—aliens.

A Dog's Trip Over Niagara Falls.

ALIVE AFTER SHOOTING THE RAPIDS, THE CATARACT, THE GORGE AND THE WHIRPOOL.

Niagara Falls village was thrown into unusual excitement yesterday by the adventures of a large dog. He was first noticed while he was within the influence of the upper rapids. As he whirled rapidly down over the falls no one imagined but that was the last of him. Shortly afterward, however, he was discovered in the gorge below the falls vainly endeavoring to clamor up upon some of the debris from the remains of the great ice bridge which recently covered the water at this point, but which had nearly all gone down the river. The news spread rapidly through the village, and a large crowd gathered on the shore. Strenuous efforts were made to get the struggling animal on shore, for an animal which had gone safely over the Falls would be a prize worth having, but without success. Finally the dog succeeded in getting upon a large cake of ice and floated off upon it down toward Suspension Bridge and the terrible whirlpool rapids. Information of the dog's coming was telephoned to Suspension Bridge village and a large crowd collected on the bridge to watch for the coming wonder. In due time the poor fellow appeared upon his ice cake, howling dismally the while, as if he appreciated the terrors of his situation. An express train crossing the bridge at the time stopped in order to let the passengers witness the unusual spectacle. Round and round whirled the cake in a dizzy way, and louder and more prolonged grew the howls of the poor dog. As the influence of the whirlpool rapids began to be felt, the cake increased in speed, whirled suddenly into the air, broke in two and the dog disappeared from view. No one thought that he could possibly survive the wild rush through the rapids. When, therefore, word was received that the dog was in the whirlpool, still living, and once more struggling vainly to swim to land, it was received with marked incredulity. This story was substantiated, however, by several trustworthy witnesses. It seems incredible that an animal could go through the upper rapids, over the falls, through the gorge, through the whirlpool rapids, and into the whirlpool itself, a distance of several miles and still be alive.

The Commercial Traveler.

By R. J. Burdette.

What would I do without the boys? How often have they been my friends? I go to a new town. I don't know where to go. The man with the samples gets off at the same station. I follow him without a tremor. He calls to the 'bus driver by name and orders him to "get out of this," as soon as we are seated. And when I follow him I am inevitably certain to go to the best house in the place. He shouts to the clerk by name, and fires a joke at the landlord as we go in. He looks over my shoulder as I register after him, and hands me his card with a shout of recognition. He peeps at the register again and watches the clerk assign me to 98. "Ninety nothing!" he shouts. "Who's in 15?" The clerk says he is saving 15 for Judge Dryasdust. "Well, he be blowed," says my cheery friend. "Give him the attic and put this gentlemen in 15." And if the clerk hesitates, he seizes the pen and gives me fifteen himself; and then he calls the porter, orders him to carry up my baggage and put a fire in 15, and then, in the same breath, adds: "What time will you be down to supper, Mr. Burdette?" And he waits for me, and seeing that I am a stranger in the town, he sees that I am cared for and that the waiters do not neglect me; he tells me about the town, the people and the business. He is always good-natured; he frisks with cigars, and overflows with "thousand-mile tickets;" he knows all the best rooms in all the hotels; he always has a key for the car seats, and turns a seat for himself and friends without troubling a brakeman, but he will ride on the woodbox or stand outside to accommodate a lady, or he will give up his seat to an old man. I know him pretty well. For three years I have been traveling with him, from Colorado to Maine, and I have seen the worst and best of him, and I know the best far outweighs the worst. I could hardly get along without him, and I am glad he is numerous.

Othello Under Disadvantages.

A theatrical company was performing "Othello" in one of the Connecticut provinces. Owing to the illness of the lady who played the *role* of "Desdemona," a local tragedienne was assigned that part. When she saw the enraged and foaming Moor advancing to smother her, her courage gave out, and, hastily crawling under the bed, she began to yell for the police. The chivalry of the pit was aroused. A sturdy young countrymen mounted the stage, and, grappling "Othello," mopped him around vigorously, amid the applause of the boys. When he recovered his freedom and his breath, he explained that he didn't mean to hurt the girl, and was only following the cue of Shakespeare. "All right," replied the rustic champion, "when you come around again fetch Shakespeare with you, and if he can lick me I'll treat."

How Alligators Eat.

"An alligator's throat," writes Eli Perkins in the *Star*, "is an animated sewer. Everything which lodges in his open mouth goes down. He is a lazy dog, and, instead of hunting for something to eat, he lets his victuals hunt for him. That is, he lays with his great mouth open, apparently dead, like the 'possum. Soon a bug crawls into it, then a fly, then several gnats and a colony of mosquitoes. The alligator don't close his mouth yet. He is waiting for a whole drove of things. He does his eating by wholesale. A little later a lizard will cool himself under the shade of the upper jaw. Then a few frogs will hop up to catch the mosquitoes. Then more mosquitoes and gnats light on the frogs. Finally a whole village of insects and reptiles settle down for an afternoon picnic. Then, all at once, there is an earthquake. The big jaw falls, the aligator slyly blinks one eye, gulps down the entire menagerie, and opens his great front door again for more visitors."

Lemon Juice and Tartaric Acid In Diphtheria.

Dr. J. R. Page, of Baltimore, in the *New York Medical Record*, invites the attention of the profession to the topical use of fresh lemon juice as a most efficient means for the removal of membrane from the throat, tonsils, etc., in diphtheria. In his hands (and he has heard several of his professional brethren say the same) it has proved by far the best agent he has yet tried for the purpose. He applies the juice of the lemon by means of a camel's hair probang to the affected parts every two or three hours, and in eighteen cases in which he has used it the effect has been all he could wish. The topical use of tartaric acid in diphtheria has also been successfully resorted to by M. Vidal. His formula is ten parts, by weight, of tartaric acid, fifteen of glycerine, and twenty-five of mint water. The acid acts upon the false membrane, converting it into a gelatinous mass, and favors its expulsion.

Compared with this week last year the exports of produce from New York are $3,245,000 *less*, and the exports of cotton from the South about $4,000,000 *more*.

Uses of Flowers.

In all ages, flowers have been made the representatives of innocence and purity. We decorate the bride and strew her path with flowers; we present the undefiled blossoms as a similitude of her beauty and untainted mind, trusting that her destiny through life will be like theirs, grateful and pleasing to all. We scatter them over the coffin, the bier, and the earth, when we consign our mortal blossoms to the dust as emblems of transient joy, fading pleasures, withered hopes; yet rest in sure and certain trust that each in due season will be renewed again. All the writers of antiquity make mention of their uses and application in heathen and pagan ceremonies, whether of the temple, the banquet, or the tomb—the rites, the pleasures, or the sorrows of man.

Jardin Mabille, Paris.

The history of the Jardin Mabille and its founders, says the London *World*, ought to tempt some pickerup of anecdotes. The original Mabille was a fashionable dancing master under the Empire and the Restoration, and taught the ancestors of the French of to-day. Mabille *père* bought some land in the Allée des Veuves, then a deserted and almost dangerous part of Paris. He opened a little summer hall, entrance fifty centimes, and twenty centimes for each dance. Old Mabille had two sons, one a dancer at the Opera, and the other, Victor, an ingenious poet and a man of enterprise. Victor Mabille conceived the Jardin Mabille that the present generation has known—Mabille with its brilliant gaslights and its zinc and bronze trees. The opening of the enlarged and marvelously embellished Mabille in 1844 was a Parisian event. Victor Mabille understood puffing and advertising. The press was invited to the opening night, and the grave *Constitutionnel* gave Mabille the honor of a *feuilleton*. The court and the town visited the garden. In their young days the Ducs d'Aumale and Montpensier frequently took a turn *incognito* in this Walhalla of the *lorette*.

Editor Engineering News:

By your printed request, I herewith send you the present rate of wages paid by us, Loss & McRae, general contractors on the New York, Lackawanna, and Western and what other railroad construction we are doing in the vicinity of Buffalo:

	Per day.
Common or unskilled labor	$1 50 to $1.62½
Quarry,	1.75 to 1.87½
Masons,	3.50 to 3.75
Stone cutters,	3.50 to 3.75
Mechanics,	2.50 to 3.50

As yet the supply is more than equal to the demand in all classes of labor, but in view of the future activity in public works there is a decided tendency of an advance in the rate of wages, which, I think, will culminate in the following prices on and after the first of May:

Common or unskilled labor	$1.75 per day.
Quarrymen,	2.00 "
Skilled masons,	4.00 "
Stonecutters,	4.00 "
Mechanics,	3.45 "

Charles E. Loss.

A Texan veteran called in to see us yesterday, and he stated positively that he did not capture Santa Anna at the battle of San Jacinto. As he is the first old Texan we have ever met who did not capture Santa Anna, there is something very strange about it. We are afraid he is an awful liar, but perhaps he was only drunk. We do not wish to do him any injustice.—*Texas Siftings.*

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In examining this republication of the sayings we had already noticed occasionally at their former appearance, we have found ourselves, in the first place, led to read the book through to our great amusement and profit; and in the second place, we have thought of a dozen persons to whom we would like to send it. Some of them are firemen; some are journeymen; some are young fellows who are hankering after machinery, and no very distinct idea of what the machinist's trade involves; some are graduates of technical schools, who need the plain talk which a book can give them without offense, and thus save them from hearing it less pleasantly from human lips; some are neither actually, perspectively, nor retrospectively machinists or mechanical engineers; but they know how to enjoy a clever satire, with a core of common sense, and therefore they would relish Chordal.

We do not mean to say that we agree with all the opinions expressed by Chordal. Why should we? He takes no special pains to agree with himself. At different times he presents different sides, with happy disregard of what he may have said earlier or may choose to say later. But what he does say is worth learning, laughing at, and then thinking over.

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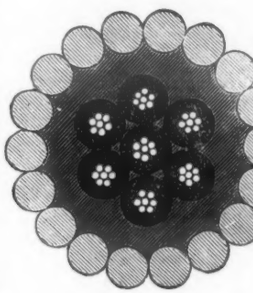

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